

4	Gadwall
22	Mallard
49	G. w. Seal
5	C. Seal
9	Spoonbill
34	Pintail
51	Redhead
1	Cormorant
1	G. B. Heron
1	Coot
3	Snowy / Heron.

180

Return records

2-4-22

#644. Mallard, shot Oct. 9 1914

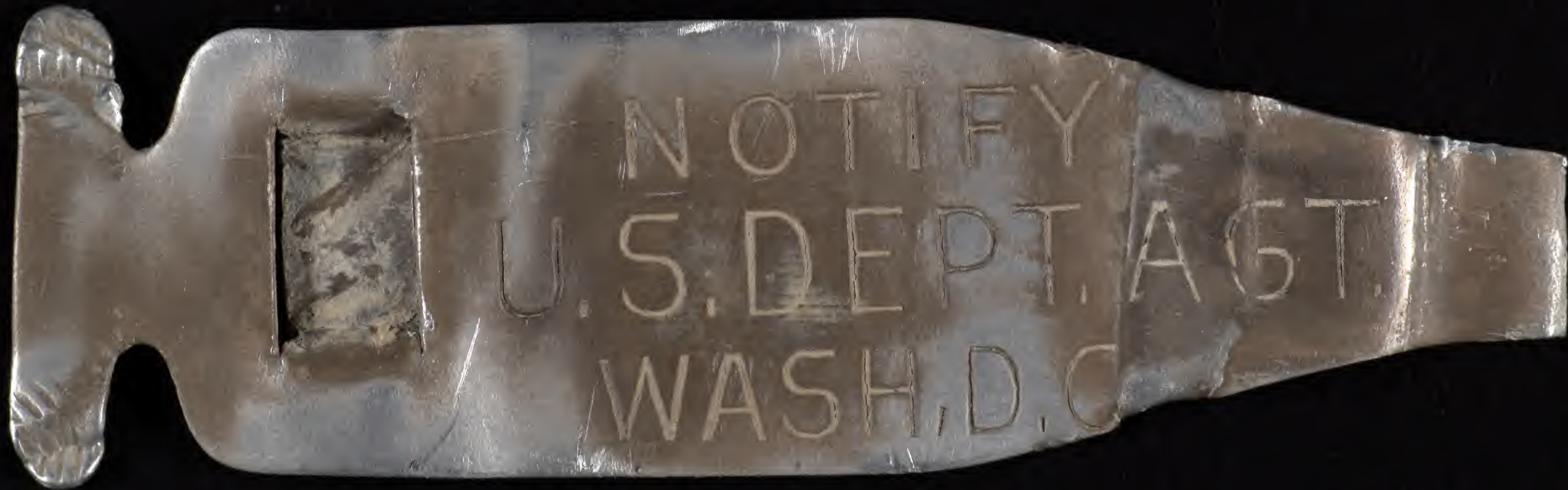
✓ 2 miles east of Tremonton, Utah
J. Harold Rees.

R.R. #1 Box 5



Pintail shot by
Chas Addison. Central Gun Club
Salt Lake Co. Utah. Nov. 14, 1914
Jide Chambers.





NOTIFY
U.S. DEPT. AGT.
WASH, D.C.

✓ #744

Pintail shot by
Chas Addison. Central Gun Club
Salt Lake Co. Utah. Nov. 14, 1914
Jide Chambers.

Bands. recovered

Bands. recovered
1 ♀ Mallard ♂ reported shot by James Hull Jr.
fall 1915. Band lost.

August 17, Banded Snowy Plover seen (immature) in 4

20 Uswald a. m.

↓ #1083 Redhead found dead with Duck Sicknes
Mouth of Kendall Canal, Dead two days. Sept. 28, 1916

1088 | accidentally Wounded at Duck pens
Sept. 29. 1916.

1099 accidentally drowned at duck pens. Oct. 2, 1916

3808 shot by James Whitcomb, Pintail Duck. Oct 1, 1916.

3969 shot Oct. 2, 1916, Bear River Club. good.

4093 .. Oct 4, End

3906 " " " " " " " " " " " "

✓ 1098 " " 5 " Duckville Gun Club pros.

986 Sponbill shot by Amos L. L. on Klondike

October 1914.

923 Killed by J. Nelson about Dec. 24, 1915

Narrowa of Jordan River 20 mi. South Salt Lake City, Utah.

✓ 4174 Killed by Hillhouse Oct 6, 1916

on Mallard Point! Mouth Bear River.

x 3985 Killed in North Bay October 7, 1916. Band
rec'd from duckhouse Bear River Club.

* 889 Killed in North Bay Oct. 7, 1916 by J. C. Neely.

* 1657. Killed in Pintail Neck Oct 8, 1916 by
10 wight stone.

+ 4054 Shot by Bert Binley Oct. 8, 1916, South Bay.

* 4090 Killed Mouth Bar River Oct. 9, 1916, Bird found
at Sackett's in Duck house.

x 4136 Killed South Bay Oct. 10, 1916 by Harry Finch.

* 4057 Killed Chesapeake Duck Club, Mouth Bear River, Utah
Oct. 7, 1916 (John H. R. Mills).

4050 killed Mouth Bear River see letter M^cAttee Oct. 18

Bird killed near Willard band given to John
Hundsen (file M.G. Booth Oct. 14)

✓ 4187 Killed at Bear River Club by J. Campion Oct 15, 1916
Within 1 hour of its release.

x 1041 Killed on old river channel Oct. 10, 1916 by H. L. Sackett
1209
x ~~1041~~ Killed Oct. 20, 1916, from duck house at
Duckville Gun Club. (poor condition.)

x 3979 Killed Oct. 21, 1916 from duck house at
Sackett's.
at duck pens.

x 1084 Killed Oct. 22, 1916, by a son of a bitch

x 3526 Killed Oct. 20, 1916 from Bear River Club
Duckhouse

x 3886 Killed Oct 20, 1916 from Bear River Club
Duckhouse

x 3988 Killed Oct. 20, 1916 from Bear River Club
Duckhouse.

Banded Birds

3501	<i>Pernis ptilorhynchus americana</i>	immature	Clear River	June 10, 1915
3502	"	"	"	"
3503	<i>Chaulelasmus streperus</i>	sick	"	June 17, 1915
3504	"	"	"	"
3505	<i>Anas platyrhynchos</i>	"	"	"
3506	<i>Podilymbus podiceps</i>	captured	"	Aug. 28, 1915
3507	"	"	"	Sept. 3, "
3508	<i>Anas platyrhynchos</i>	sick	"	Sept. 5 "
3509	<i>Mareca americana</i>	"	Mouth Bear River	Sept 14, 1915
3510	<i>Chaulelasmus streperus</i>	immature	"	" " "
3511	"	"	"	" " "
3512	"	"	"	" " "
3513	"	"	"	" " "
3514	<i>Querquedula cyanoptera</i>	"	"	" " "
3515	"	Adult	"	" " "
3516	<i>Anas platyrhynchos</i>	♂ sick	"	Sept 14, 1915
3517	"	♂ " (801)	"	" " "
3518	<i>Chaulelasmus streperus</i>	imm.	"	" " "
3519	<i>Anas platyrhynchos</i>	sick ♂ imm.	"	" " "
3520	<i>Nettion carolinense</i>	♂ sick (829)	"	" " "
3521	"	♀ " (839)	"	" " "
3522	"	♀ "	"	Sept. 26, 1915
3523	"	♂ "	"	" " "
3524	"	♀ "	"	" " "
3525	"	♂	"	" " "
3526	"	♀ sick.	"	" " "
3527	<i>Dafila acuta</i>	♂ imm "	"	Sept. 28, 1915
3528	<i>Nettion carolinense</i>	♂ (847)	"	" " "
3529	"	" (853)	"	" " "
3530	"	♀ (820)	"	" " "
3531	"	" (858)	"	" " "

Banded Birds.

767	<i>Aechmophorus occidentalis</i>	Bear River July 3, 1915	healthy
768	<i>Phalacrocorax ulophus</i>	" " " " "	shot & recovered
769	<i>Nycticorax n. naevius</i>	" " Aug. 14	young bird.
770	<i>Marila americana</i>	" " Aug. 15	$\frac{3}{4}$ grown
771	"	" " "	full grown
772	"	" " "	$\frac{3}{4}$ "
773	"	"	$\frac{2}{3}$
773	"	" " "	$\frac{7}{8}$ "
774	"	" " "	almost full
775	"	" " "	$\frac{7}{8}$ "
776	"	" " "	+ $\frac{3}{4}$ "
777	"	" " "	+ $\frac{3}{4}$ + "
778	"	" " "	+ $\frac{7}{8}$ "
779	"	" " "	$\frac{7}{8}$ "
780	"	" " "	$\frac{7}{8}$ "
781	"	" " "	+ $\frac{3}{4}$ "
782	"	" " "	not quite full "
783	"	" " "	+ $\frac{3}{4}$ "
784	"	" " "	$\frac{7}{8}$ "
785	"	" " "	+ $\frac{2}{3}$ "
786	"	" " "	$\frac{3}{4}$ "
787	"	" " "	not quite full "
788	"	" " "	+ $\frac{2}{3}$ "
789	"	" " "	+ $\frac{3}{4}$ "
790	"	" " "	$\frac{3}{4}$ "
791	"	" " "	$\frac{7}{8}$ "
792	"	" " "	+ $\frac{7}{8}$ "
793	"	" " "	+ $\frac{2}{3}$ "
794	"	" " "	not quite full "
795	"	" " "	$\frac{7}{8}$ "
796	"	" " "	$\frac{3}{4}$ "
797	"	" " "	$\frac{3}{4}$ "
798	"	" " "	not quite full "

799	Marila americana	Month Bear Riv. Utah	Aug. 15, 1915	$\frac{7}{8}$ grown
<u>800</u>	"	"	"	$\frac{7}{8}$ "
901	"	"	"	$+\frac{7}{8}$ "
902	"	"	"	$+\frac{7}{8}$ "
903	"	"	"	$\frac{7}{8}$ "
904	"	"	"	$\frac{2}{3}$ "
905	"	"	"	$\frac{2}{3}$ "
906	"	"	"	$\frac{2}{3}$ "
907	"	"	"	$+\frac{2}{3}$ "
908	"	"	"	$\frac{2}{3}$ "
909	"	"	"	$\frac{2}{3}$ "
910	"	"	"	$\frac{3}{4}$ "
911	"	"	Aug. 22, 1915	$\frac{7}{8}$
912	"	"	"	$\frac{7}{8}$
913	"	"	"	$\frac{7}{8}$
914	"	"	"	almost full
915	"	"	"	"
916	"	"	"	"
917	"	"	"	$\frac{3}{4}$
918	"	"	"	almost full
919	"	"	"	"
920	"	"	"	$\frac{7}{8}$
921	"	"	"	$\frac{3}{4}$
922	"	"	"	$\frac{3}{4}$
923	"	"	"	$\frac{3}{4}$
924	"	"	"	$\frac{3}{4}$
925	"	"	"	$\frac{7}{8}$
926	"	"	"	$\frac{3}{4}$
927	"	"	"	$\frac{3}{4}$
928	"	"	"	$\frac{7}{8}$
929	"	"	"	$\frac{7}{8}$
930	"	"	"	$\frac{3}{4}$
931	Larus californicus	"	Aug. 28, 1915	sick.

864	<i>Querquedula cyanoptera</i>	North Bear River, Utah	Aug. 5, 1916	immature Escaped.
896	<i>Erismatura jamaicensis</i>	"	May 30	♂ ad
897	"	"	"	♀ ad
898	<i>Echmophorus occidentalis</i>	"	May 29	adult
899	"	"	"	"
900	"	"	"	"
889	<i>Marila americana</i>	"	Aug 25	Escaped from experiment pen.
888	"	"	" 28	"
1148	<i>Nettion carolinense</i>	"	Oct. 24	♀
1145	"	"	"	♂
1146	"	"	"	♂

992 *Ardea h. tringaria* Mouth Bear River Utah, July 3, 1916 young

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1

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(Oswald)

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July 10, 1916

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(874)

2 *Marila americana*

"

Aug 20, 1916

"

$\frac{3}{4}$ gram

3

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in (877)

4

"

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"

$\frac{3}{4}$

5

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(876)

6

missing

"

"

"

4

7

Marila americana

"

"

"

$\frac{2}{3}$

8

"

"

"

"

"

$\frac{3}{4}$ (879)

9

"

"

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"

Aug 27, 1916

$\frac{2}{3}$

1010

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1

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$\frac{3}{4}$

2

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$\frac{2}{3}$

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$\frac{2}{3}$

4

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$\frac{2}{3}$

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$\frac{2}{3}$

6

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$\frac{2}{3}$

7

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$\frac{2}{3}$

8

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$\frac{1}{3}$

9

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1020

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Aug 31, 1916

$\frac{2}{5}$

1

"

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"

"

Sept 2.

$\frac{2}{3}$ ♀

2

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$\frac{2}{3}$

3

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"

"

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$\frac{3}{4}$

4

"

"

"

"

$\frac{3}{4}$

5

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"

"

"

$\frac{2}{3}$

1916
1026 *Marula americana* Mouth of Bear River, Utah, Sept 2 $\frac{2}{3}$ green

7

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"

"

$\frac{2}{3}$

8

"

"

"

$\frac{2}{3}$

9

"

"

Sept. 4 $\frac{3}{4}$ ♂

103 0

"

"

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$\frac{2}{3}$

1

"

"

"

$\frac{3}{4}$ ♀

2

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$\frac{3}{4}$ ♂

3

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$\frac{3}{4}$ ♀

4

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full ♂

5

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$\frac{6}{14}$ ♂

6

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$\frac{3}{4}$ ♂

7

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$\frac{3}{4}$

8

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$\frac{3}{4}$ ♀

9

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$\frac{2}{3}$

104 0

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$\frac{2}{3}$

1

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$\frac{2}{3}$

2

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$\frac{3}{4}$ ♀

3

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$\frac{3}{4}$ ♂

4

"

"

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$\frac{3}{4}$ ♂

5

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$\frac{2}{3}$

6

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$\frac{7}{8}$ ♀

7

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$\frac{2}{3}$

8

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$\frac{3}{4}$

9

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$\frac{2}{3}$ sick

105 0

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$\frac{3}{4}$ ♂

1

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$\frac{3}{4}$ ♂

2

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$\frac{2}{3}$

3

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Sept 7 $\frac{3}{4}$ ♂

4

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$\frac{7}{8}$

5

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$\frac{2}{3}$

6

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$\frac{3}{4}$ ♀

7

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"

$\frac{7}{8}$

8

"

"

"

$\frac{7}{8}$ ♂

9

"

"

"

$\frac{2}{3}$

1060	<i>Marula americana</i>	Mouth of Bear River, Utah	1916	Sept. 7	♂ $\frac{2}{3}$
1	"	"	"	"	$\frac{2}{3}$ ♀
2	"	"	"	"	$\frac{7}{8}$
3	"	"	"	"	$\frac{7}{8}$ ♂
4	"	"	"	"	$\frac{3}{4}$ ♀
5	"	"	"	"	$\frac{7}{8}$ ♀
6	"	"	"	"	$\frac{7}{8}$ ♂
7	"	"	"	"	$\frac{2}{3}$
8	"	"	"	"	$\frac{3}{4}$
9	"	"	"	"	$\frac{3}{4}$
1070	"	"	"	"	$\frac{3}{4}$ ♀
1	"	"	"	"	$\frac{3}{4}$
2	"	"	"	"	$\frac{7}{8}$ ♂
3	"	"	"	"	$\frac{2}{3}$
4	"	"	"	"	$\frac{3}{4}$
5	"	"	"	"	♀ sick
6	"	"	"	"	$\frac{7}{8}$
7	"	"	Sept 8	"	$\frac{7}{8}$
8	"	"	"	"	$\frac{7}{8}$ ♀
9	"	"	"	"	$\frac{7}{8}$ ♀
1080	"	"	"	"	$\frac{7}{8}$
1	"	"	"	"	$\frac{7}{8}$ ♂
2	"	"	"	"	$\frac{3}{4}$
3	"	"	"	"	$\frac{7}{8}$
4	"	"	"	"	$\frac{7}{8}$
5	"	"	"	"	$\frac{3}{4}$
6	"	"	"	"	full yr. ♂
7	"	"	"	"	" ♂
8	"	"	"	"	" ♀
9	"	"	"	"	$\frac{7}{8}$ ♀
1090	"	"	"	"	$\frac{7}{8}$ ♂
1	"	"	"	"	full ♂
2	"	"	Sept 17	$\frac{2}{3}$ (895)	

1916
1093 *Maia americana* Mouth Bear River, Utah, Sept. 17- 2/3 (1102)

4

"

"

"

♀ 7/8

5

"

"

"

7/8

6

"

"

"

7/8

7

"

"

"

7/8

8

"

"

Sept. 27

♂

9

"

"

"

♂

1200

"

"

"

♂

1

"

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"

♂

2

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(884)

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♂ (m)

4

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♀ (1117)

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♀

6

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(892)

7

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8

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9

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(1115)

1210

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1/2

1

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(1119)

2

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(1121)

3

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7

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8

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9

"

"

"

1220

"

"

"

(1116)

1

"

"

"

2

3

4

5

Birds banded.

3532 *Plegadis guarauna*. Mouth Bear Riv. Utah - July 3, 1916, young

3

4

5

Egretta c. candidissima

6

7

8

Plegadis guarauna

9

3540

1

2

3

Egretta c. candidissima

4

5

6

7

Plegadis guarauna

8

Egretta c. candidissima

9

Plegadis guarauna

3550

1

2

3

4

5

6

7

8

9

3560

1

2

3

4

3565 *Plegadis guarauna*. Mouth Bear River, Utah, July 3, 1916 young

6	"	"	"	"
7	"	"	"	"
8	"	"	"	"
9	"	"	"	"

3570 " " " "

1	"	"	"	"
2	"	"	"	"
3	"	"	"	"
4	"	"	"	"
5	"	"	"	"
6	"	"	"	"
7	"	"	"	"
8	"	"	"	"
9	"	"	"	"

3580 *Egretta c. candidissima* " "

1	"	"	"	"
2	"	"	"	"

3 *Plegadis guarauna* " "

4 *Egretta c. candidissima* " "

5 " " "

6 " " "

7 " " "

8 *Plegadis guarauna* " "

9 *Egretta c. candidissima* " "

3590 *Plegadis guarauna* " "

1 *Egretta c. candidissima* " "

2 " " "

3 " " "

4 " " "

5 " " "

6 " " "

7 *Plegadis guarauna* " "

8 " " "

3599 *Plegadis guarauna* Mouth Bear River, Utah July 3, 1916 young

3600

1 *Nycticorax n. naevius*

2 *Plegadis guarauna*

3 "

4 *Nycticorax n. naevius*

5 *Plegadis guarauna*

6 "

7 *Egretta c. candidissima*

8 "

9 *Plegadis guarauna*

3610 *Egretta c. candidissima*

1 "

2 *Plegadis guarauna*

3 *Egretta c. candidissima*

4 *Plegadis guarauna*

5 *Egretta c. candidissima*

6 *Nycticorax n. naevius*

7 "

8 *Plegadis guarauna*

9 "

3620

1 *Egretta c. candidissima*

2 "

3 "

4 *Nycticorax n. naevius*

5 *Egretta c. candidissima*

6 *Plegadis guarauna*

7 "

8 "

9 "

3630

1 "

2 "

July 14, 1916

3633 *Plegadis quararung* Mouth Bear River Utah July 14, 1916, young

4 *Egretta c. candidissima*

5 *Egretta c. candidissima*

6

7

8

9

3640

1

2

3

4

5

6

7

8

9

3650

1

2

3

4

5

6

7

8

9

3660

1

2 *Ardea h. tringaria*

3 *Egretta c. candidissima*

4

5

6

3667 *Egretta c. candidissima* Mouth Bear River, Utah, July 14, 1916. young
8 *Plegadis guarauna* " Aug 7 " "
9 *Egretta c. candidissima* " July 14 " "

3670

1

2

3

4 *Plegadis guarauna*

5 *Egretta c. candidissima*

6 *Plegadis guarauna*

7 *Nycticorax n. naevius*

8 *Plegadis guarauna*

9 *Egretta c. candidissima*

3680

1

2

3

4

5

6

7

8

9 *Plegadis guarauna*

3690

1

2

3

4

5

6

7

8

9

3700

3701 *Plegadis guarauna* Mouth Bear River, Utah, July 14, 1916, young.

2

3

4

5

6

7

8

9

3710

1

2

3

4

5

6

7

8

9

3720

1

2

3

4

5

6

7

8

9

3730

1

2

3

4

Fulica americana

Nettion carolinense

missing

Aug. 20, 1916 im-not sick

(1873)

not sick

sick

♂

3735 *Nettion carolinense* . Mouth River, Utah Aug 20, 1916. ♀ sick
 6 *Querquedula cyanoptera* " " ♀ im. not sick
 7 " " " " ♀ im " "
 8 " " " " " " "
 9 " " " " " " "

3740 " " " " " " "
 1 " " " " " " "
 2 *Dafila acuta* " " " " ♂ ad
 3 " " " " " " "
 4 " " " " " " "
 5 " " " " " " "
 6 " " " " " " ♀
 7 " " " " " " ♂
 8 " " " " " " "
 9 " " " " " " ♂ im. not sick

3750 " " " " " " ♀
 1 *Egretta c. candidissima* " Aug 21, 1916
 2 *Anas platyrhynchos* " Aug. 27, 1916 ♂ ad ^{rump} eaten
 3 *Dafila acuta* " " ♀
 4 " " " " ♂
 5 " " " " ♂
 6 " " " " ♂
 7 " " " " ♂
 8 " " " " ♀
 9 " " " " ♀

3760 " " " " " " ♂
 1 " " " " " " ♂
 2 " " " " " " ♀
 3 " " " " " " ♀
 4 " " " " " " ♀
 5 " " " " " " ♂ im 7/22 ^{very sick. bought}
 6 " " " " " " ♂
 7 " " " " " " ♀
 8 *Chaulelasmus streperus* " " ♂

3769	<i>Chaulelasmus streperus</i>	North Bear River, Utah	Aug. 27, 1916	♀ 880
3770	"	"	"	♀ 881
1	"	"	"	♂ 878
2	<i>Anas platyrhynchos</i>	"	"	♂
3	<i>Himantopus mexicanus</i>	"	"	im
4	<i>Podilymbus podiceps</i>	"	Aug 29, 1916	not sick
5	<i>Dafila acuta</i>	"	" 31	♂ ad ^{rump} eaten
6	<i>Anas platyrhynchos</i>	"	"	"
7	<i>Recurvirostra americana</i>	"	Sept 1,	ad.
8	<i>Anas platyrhynchos</i>	"	"	♂ ad ^{rump} eaten
9	<i>Dafila acuta</i>	"	"	♀
3780	"	"	"	♀
1	<i>Anserquedula cyanoptera</i>	"	"	♀
2	<i>Spatula clypeata</i>	"	"	♂
3	"	"	"	♂
4	"	"	"	♂
5	"	"	"	♂
6	"	"	"	♂
7	<i>Fulica americana</i>	"	"	im.
8	"	"	"	ad
9	"	"	"	im (882)
3790	<i>Anserquedula cyanoptera</i>	"	"	♀
1	"	"	"	♀
2	"	"	"	♀
3	<i>Neltrion carolinense</i>	"	Sept. 2, 1916	♂
4	"	"	"	♂
5	"	"	"	♀
6	"	"	"	♂
7	"	"	"	♀
8	"	"	"	♀
9	"	"	"	♂
3800	"	"	"	♂ still a flopper
1	"	"	"	♀
2	"	"	"	♂

3803 *Nuttall carolinensis* Mouth of Bear River Utah Sept. 2

4
5
6
7
8
9

♂
♂
♂
♂
♂
♂
♀

3810 *Querquedula cyanoptera*

1
2
3

♀
♂
♀
♂

4 *Dafila acuta*

Sept. 4

5
6
7
8
9

♂
♂
♂
♂
♀

3820

1
2
3

♂
♂
♂

4 *Anas platyrhynchos*

5

♂

6 *Nuttall carolinensis*

7

♀

8

♀

9

♀

3830 *Querquedula cyanoptera*

1

♀

2

♂

3

♀

4

♂

5

♀

6 *Spatula clypeata*

♂

3837	<i>Himantopus mexicanus</i>	Mouth of Bear River, Utah	Sept 6	imm.
8	<i>Gotaurus lentiginosus</i>	"	Sept 7	not ack
9	<i>Dafila acuta</i>	"	"	♂
3840	"	"	"	♂
1	"	"	"	♂
2	"	"	"	♂
3	"	"	"	♂
4	"	"	"	♂
5	"	"	"	♀
6	"	"	"	♀
7	"	"	"	♂
8	"	"	"	♀
9	<i>Anas platyrhynchos</i>	"	"	♂
3850	<i>Querquedula cyanoptera</i>	"	"	♀
1	"	"	"	♂
2	"	"	"	♀
3	"	"	"	♂
4	"	"	"	♂
5	<i>Nettion carolinense</i>	"	"	♂
6	"	"	"	♂
7	"	"	"	♂
8	"	"	"	♂
9	"	"	"	♂
3860	"	"	Sept 8	imm. ♂ eaten
1	"	"	"	♀
2	<i>Spatula clypeata</i>	"	"	♀
3	"	"	"	♀
4	<i>Mareca americana</i>	"	Sept 11	♂ ad.
5	<i>Anas platyrhynchos</i>	"	"	♂
6	<i>Nettion carolinense</i>	"	"	♂
7	"	"	"	♀
8	"	"	"	♂
9	"	"	"	♂

3870 *Nettion carolinense* Mouth of Bear River, Utah Sept. 11, 1916 ♂

1	"	"	"	♂
2	"	"	"	♂
3	"	"	"	♂
4	"	"	"	♂
5	"	"	"	♂
6	"	"	"	♂
7	"	"	"	♂
8	"	"	"	♂
9	"	"	"	♂

3880

1	"	"	"	♂
2	"	"	"	♂
3	"	"	"	♂
4	"	"	"	♂
5	"	"	"	♀
6	"	"	"	♀
7	"	"	"	♂
8	"	"	"	♂
9	"	"	"	♂

3890

1	"	"	"	♂
2	"	"	"	♂
3	"	"	"	♀
4	"	"	"	♂
5	"	"	"	♂
6	"	"	"	♂
7	"	"	"	♀

8 *Querquedula cyanoptera* "

9 *Fulica americana* " end.

10 *Marila americana* " sick bird

3900

1 *Querquedula cyanoptera* " ♀

2 *Nettion carolinense* " rump badly eaten

3903	<i>Nettion carolinense</i>	Mouth Bear River, Utah	Sept 14	1916	♀ rump badly eaten
4	<i>Dafila acuta</i>	"	"	17	♀
5	"	"	"	"	♂
6	"	"	"	"	♀
7	"	"	"	"	♂
8	"	"	"	"	♂
9	"	"	"	"	♀
3910	<i>Anas platyrhynchos</i>	"	"	"	♂ (866) fat.
1	"	"	"	"	♂
2	"	"	"	"	♂ (871) fat
3	"	"	"	"	♂
4	<i>Nettion carolinense</i>	"	"	"	♂
5	"	"	"	"	♂ (1104)
6	"	"	"	"	♂
7	"	"	"	"	♀
8	"	"	"	"	♂
9	"	"	"	"	♂
3920	"	"	"	"	♂
1	"	"	"	"	♂
2	"	"	"	"	♂
3	"	"	"	"	♂
4	"	"	"	"	♂
5	"	"	"	"	♂
6	"	"	"	"	♂
7	"	"	"	"	♀
8	"	"	"	"	♂
9	"	"	"	"	♂
3930	"	"	"	"	♂
1	"	"	"	"	♂
2	"	"	"	"	♂
3	"	"	"	"	♂
4	"	"	"	"	♂
5	"	"	"	"	♂

1916

3936 *Nethion carolinense* Mouth Bear River Utah Sept. 17.

7	"	"	"	♂
8	"	"	"	♀
9	"	"	"	♂
3940	"	"	"	♂
1	"	"	"	♂
2	"	"	"	♂
3	"	"	"	♂
4	"	"	"	♂
5	"	"	"	♂
6	"	"	"	♂
7	"	"	"	♂
8	"	"	"	♂
9	"	"	"	♂

3950

1	"	"	"	♂
2	"	"	"	♀
3	"	"	"	♀
4	"	"	"	♀
5	"	"	"	♂
6	"	"	"	♂
7	"	"	"	♂
8	"	"	"	♀
9	"	"	"	♀

rempection

3960

Lunioa fava

Sept. 19 ad.

1 *Nethion carolinense*

Sept. 20, ♂

2

"

♂

3

"

♂

4

"

♂

5

"

♂

6

"

♂

7

"

♂

8

"

♂

3969	<i>Nettion carolinense</i>	Mouth Bear River, Utah	1916 Sept 20	♂
3970	"	"	"	♀
1	"	"	"	♂
2	"	"	"	♀
3	"	"	"	♂
4	"	"	"	♂
5	"	"	"	♂
6	<i>Querquedula cyanoptera</i>	"	"	♀
7	<i>Nettion carolinense</i>	"	"	♀
8	"	"	"	♂
9	"	"	"	♂
3980	<i>Spatula clypeata</i>	"	"	♂
1	<i>Querquedula cyanoptera</i>	"	"	♂
2	<i>Spatula clypeata</i>	"	"	♂
3	"	"	"	♂
4	<i>Nettion carolinense</i>	"	"	♀ back water
5	<i>Spatula clypeata</i>	"	Sept 25	♀
6	"	"	"	♀
7	"	"	"	♂
8	<i>Nettion carolinense</i>	"	"	♂ rump patch
9	"	"	"	♀ weak
3990	"	"	"	♂ rump patch
1	"	"	"	♂ " "
2	"	"	"	♀ " "
3	"	"	"	♂
4	<i>Anas platyrhynchos</i>	"	"	♂ crippled foot rec. head problem
5	"	"	"	♂ " "
6	<i>Anas platyrhynchos</i>	Salt Lake City, Utah	"	♂
7	"	"	"	♀
8	"	"	"	♀
9	"	"	"	♀
4000	"	"	"	♀
1	<i>Dafila acuta</i>	"	"	♂

State
fair

40022 *Dafila acuta*, Salt Lake City, Utah,

3

4

5

6

7

8

9

4010

1

2

3

4

5

6

7

8

9

4020

1

2

3

4

5

6

7

8

9

4030

1

2

3

4

missing

Dafila acuta

Chaulelasmus streptus

Mareca americana

Mareca americana

Nettion carolinense

North Bear River, Utah, Sept. 27.

Salt Lake City, Utah

North Bear River, Utah, Sept. 27.

Salt Lake City, Utah

♂

♂

♂

♂

♀

♀

♂

♂

♂

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♂

State Fair

State Fair

State Fair

4068	<i>Spatula clypeata</i>	Month Bear River, Utah	1916 Sept. 28	♂
9	<i>Chamaeleus chryseus</i>	"	"	♀
4070	<i>Spatula clypeata</i>	"	"	♀
1	"	"	"	♂
2	"	"	"	♂
3	"	"	"	♂
4	"	"	"	♀
5	"	"	"	♂
6	"	"	"	♀
7	<i>Anas platyrhynchos</i>	"	Sept. 29	♀
8	"	"	"	♀
9	<i>Dafila acuta</i>	"	"	♂
4080	"	"	"	♂
1	"	"	"	♂
2	"	"	"	♂
3	"	"	"	♂
4	<i>Anas platyrhynchos</i>	"	"	♂ rump eaten
5	"	"	"	♂
6	<i>Nettion carolinensis</i>	"	"	♂
7	"	"	"	♀
8	"	"	"	♀
9	"	"	"	♀
4090	"	"	"	♀
1	"	"	"	♂
2	"	"	"	♀
3	"	"	"	♂ (1105)
4	"	"	"	♂
5	"	"	"	♂
6	"	"	"	♂ (1118)
7	"	"	"	♀
8	"	"	"	♀
9	"	"	"	♂
4100	"	"	"	♂

1916

4101 *Nettion carolinense* Mouth Bear River Utah Sept 29

2	"	"	♀
3	"	"	♂
4	"	"	♀
5	"	"	♀
6	"	"	♂
7	"	"	♀
8	"	"	♂
9	<i>Spatula clypeata</i>	"	♂

4110

1	"	"	♀
2	"	"	♂
3	"	"	♂

4 *Mareca americana*

5 *Wajila acuta*

6	"	"	♀
7	"	"	♂
8	"	"	♂
9	"	"	♀

4120

1 *Nettion carolinense*

2	"	"	♀
3	"	"	♂
4	"	"	♀
5	"	"	♀
6	"	"	♂
7	"	"	♂
8	"	"	♂
9	"	"	♀

4130

1	"	"	♀
2	"	"	♀
3	"	"	♂

Sept 30

		1916	
4134	<i>Nettion carolinense</i>	North Bear River, Utah	Sept 30, ♀
5	<i>Querquedula cyanoptera</i>	"	♂
6	<i>Nettion carolinense</i>	"	♂
7	"	"	♀
8	"	"	♂
9	"	"	♂
4140	"	"	♀
1	"	"	♀
2	"	"	♀
3	"	"	♀
4	"	"	♀
5	"	"	♀
6	"	"	♀
7	"	"	♀
8	<i>Spatula clypeata</i>	"	♀
9	"	"	♂
4150	<i>Nettion carolinense</i>	"	Oct 3 ♂
1	"	"	♂
2	"	"	♂
3	"	"	♀
4	"	"	♀
5	"	"	♂
6	"	"	♂
7	"	"	♀
8	"	"	♀
9	"	"	♂
4160	"	"	♀
1	"	"	♂
2	"	"	♂
3	"	"	♂
4	"	"	♀
5	"	"	♀
6	"	"	♀

		1916	
4167	<i>Nettion carolinense</i> . Mouth Bear River, Utah	Oct. 3	♀
8	"	"	♀
9	<i>Querquedula cyanoptera</i>	"	♀
4170	<i>Nettion carolinense</i>	"	♀
1	"	"	♀
2	<i>Mareca americana</i>	"	♂
3	"	"	♂
4	<i>Querquedula cyanoptera</i>	"	♂
5	"	"	♀
6	<i>Mareca americana</i>	"	♂
7	<i>Dafila acuta</i>	"	♀
8	<i>Larus delawarensis</i>	Oct. 14	
9	"	"	
4180	<i>Dafila acuta</i>	"	♂ ^{cured} leucoporia
1	"	Oct. 15	♂
2	<i>Mareca americana</i>	"	♀
3	<i>Dafila acuta</i>	"	♂
4	"	"	♀
5	"	"	♂
6	<i>Anas platyrhynchos</i>	"	♀
7	<i>Dafila acuta</i>	"	♀
8	<i>Mareca americana</i>	"	♂
9	<i>Spatula clypeata</i>	"	♂
4190	<i>Nettion carolinense</i>	"	♀
1	"	"	♂
2	"	"	♂
3	"	"	♂
4	<i>Anas platyrhynchos</i>	Oct. 23	♀ (963)
5	<i>Mareca americana</i>	"	(1105)
6	"	"	♂ (1136)
7	<i>Anas platyrhynchos</i>	"	♀ (1131)
8	<i>Nettion carolinense</i>	"	♀
9	"	"	♂

4200 missing 1912
Nuttall carolinensis Mouth Bear River Utah Oct 23

1				♀
2				♂
3				♀
4				♂
5				♂
6				♀
7				♀
8				♂
9				♀

4210

1				♀
2	Marila americana			♂ (lost in July 3)
3	Dafila acuta			♀
4	Nuttall carolinensis			♂
5	"			♂ (1140)
6	"			♀ (1139)
7	"			♂ (1137)
8				

932	<i>Marula americana</i>	North Bear River, Utah, Sept 3, 1915	full grown
933	"	"	"
934	"	"	"
935	"	"	"
936	"	"	"
937	"	"	"
938	<i>F. ulia americana</i>	"	"
939	"	"	"
940	"	"	"
941	"	"	"
942	"	"	"
943	"	"	"
944	"	"	"
945	"	"	"
946	<i>Marula americana</i>	Sept. 14,	♂ im. (838)
947	"	"	♀ im. (817)
948	"	"	"
949	"	"	"
950	"	"	♂ im. (807)
951	"	"	♂ im. (815)
952	"	"	♂ im. (840)
953	"	"	♂ im. (814)
954	"	"	♀ im. (832)
955	"	"	♂ im. (830)
956	"	"	♀ im. (819)
957	"	Sept. 20	♀ im.
958	"	"	♂ im. (833)
959	"	"	♂ im. (851)
960	"	"	♂ im.
961	"	"	♀ im.
962	"	"	♂ im.
963	"	"	♀ im. (834)
964	"	"	♀ im.
965	"	"	♂ im.

966	Marila	American	North	Bear	River	Utah	Sept. 20, 1915	Imm.
967	"	"	"	"	"	"	"	Imm.
968	"	"	"	"	"	"	"	Imm.
969	"	"	"	"	"	"	Sept 25	Imm.
970	"	"	"	"	"	"	"	"
971	"	"	"	"	"	"	"	"
972	"	"	"	"	"	"	"	"
973	"	"	"	"	"	"	"	Imm.
974	"	"	"	"	"	"	"	"
975	"	"	"	"	"	"	"	Imm.
976	"	"	"	"	"	"	"	"
977	"	"	"	"	"	"	"	"
978	"	"	"	"	"	"	"	"
979	"	"	"	"	"	"	Sept. 28 1915	Imm (860)
980	"	"	"	"	"	"	"	(856)
981	"	"	"	"	"	"	"	(841)
982	"	"	"	"	"	"	"	Imm (861)
983	"	"	"	"	"	"	"	" (857)
984	"	"	"	"	"	"	"	" (848)
985	"	"	"	"	"	"	"	" (854)
986	"	"	"	"	"	"	"	"
987	"	"	"	"	"	"	"	"
988	"	"	"	"	"	"	"	"

Return records on bands.

- ↓ 553 *Dafila acuta* ♀ shot on Land's End, by Jack Johnson, about October 10, 1914. in good condition
- ↓ 551. *Nettion carolinense*. shot in Seal Pass. by Jack Johnson about October 10, 1914 in good condition.
- ↓ 508 *Nettion carolinense*. Brought in to Duckville Gun Club about October 7, 1914 in good condition
- ↓ 516 *Dafila acuta* Brought in to Duckville Gun Club about October 10, 1914 in good condition
- ↓ 561 *Nettion carolinense* Brought in to Duckville Gun Club about October 10, 1914 in good condition
- ↓ *Spatula clypeata*. shot by Axel Deth on Klondike. reported to me by Fred Hansen Oct. 18, said that band would be sent in.
- ↓ Pintail shot by Jim Belnap south of Weber Oct. 10 about. band sent in.
- ↓ 736. Killed south of Hooper Utah Oct. 18, 1914 on Third Creek between Hooper & Warren by Hazel Clpson.

Bands recovered.

- ✓ 3511. Sackitt's second. Oct. 1-8, 1915.
- ✓ 947 " " " " in river near club.
- ✓ 977 " " " " "
- ✓ 980 " " " " "
- ✓ 972 " " " " "
- ✓ 936. Shot by Wm Winchester, West of Corinne Oct. 1-8, 1915
- ✓ 3528. Bear River Club Oct. 1-8-1915.
- ✓ 970 " " " in river near pens
- ✓ 987 " " " "
- ✓ 967 Mr. Knott ^{Utah Construction Co Ogden, Utah} Bear River Club. Oct. 17, 1915 shot flying ^{river}.
- ✓ 3512 D. E. Rhivers - Mouth Bear River. Oct. 1, 1915.
- ✓ 978. Lloyd Burrup, R468 Lincoln Ave, Ogden, Utah
shot at Corinne, Utah, Oct. 1, 1915.
- ✓ 768 F. G. Fryrear, 1131 Princeton Ave, Salt Lake City
shot in marshes 12 mi. N.W. of Salt Lake Oct. 10, 1915
- ✓ 783 Mina Beauregard, Gunnison, Utah,
reported Oct. 11, 1915.
- ✓ 913 Wm McDonald, 429 E. 2nd South St. Logan.
Cache Co. Utah reported Oct. 3, 1915.
- ✓ 771. Geo. Dally. Bear River City, Utah.
Oct. 2. Bear River City, Utah.

Birds banded.

- 501 *Nettion carolinense*, Mouth of Bear River, Utah, Sept. 16, 1914
 502 " " " " "
 503 " " " " "
 504 " " " " "
 505 *Dafila acuta* " "
 506 *Nettion carolinense* " "
 507 *Dafila acuta* ♀ " "
 508 *Nettion carolinense* " "
 509 " " " " "
 510 " " " " "
 511 *Dafila acuta* ♂ " "
 512 *Nettion carolinense* " "
 513 *Spatula clypeata* ♂ " "
 514 *Nettion carolinense* " "
 515 " " " " "
 516 *Dafila acuta* " "
 517 " " ♂ " "
 518 *Nettion carolinense* " "
 519 *Dafila acuta* ♂ " "
 520 " " ♂ " "
 521 " " ♂ " "
 522 " " ♂ " "
 523 " " ♂ " "
 524 " " ♀ " "
 525 *Querquedula discorsipennis* " "
 526 *Dafila acuta* ♀ " "
 527 *Anas platyrhynchos* ♂ " "
 528 *Nettion carolinense* " "
 529 " " " " "
 530 *Dafila acuta* " "
 531 " " " " "
 532 " " ♀ " "
 533 *Nettion carolinense* " "

- 534 *Anas platyrhynchos* ♂ Mouth of Bias River, Sept. 16, 1914
- 535 *Dafila acuta* ♀ " "
- 536 *Nettion carolinense* " "
- 537 *Dafila acuta* ♂ " "
- 538 *Nettion carolinense* ♀ " "
- 539 *Dafila acuta* ♂ " "
- 540 *Nettion carolinense* " "
- 541 *Dafila acuta* ♀ " "
- 542 " " ♂ " "
- 543 " " ♀ " "
- 544 *Nettion carolinense* " "
- 545 *Dafila acuta* ♂ " "
- 546 " " ♂ " "
- 547 *Nimantopus mexicanus* " "
- 548 *Dafila acuta* ♂ " "
- 549 " " ♂ " "
- 550 " " ♂ " "
- 551 *Querquedula cyanoptera* " "
- 552 *Nettion carolinense* " "
- 553 *Dafila acuta* ♀ " "
- 554 " " ♀ " "
- 555 " " " " " "
- 556 " " ♀ " "
- 557 " " ♀ " "
- 558 *Nettion carolinense* " "
- 559 *Dafila acuta* ♀ " "
- 560 " " ♂ " "
- 561 *Nettion carolinense* " "
- 562 *Dafila acuta* ♂ " "
- 563 *Anas platyrhynchos* ♀ " "
- 564 *Dafila acuta* ♂ " "
- 565 *Spatula clypeata* " "
- 566 *Dafila acuta* " "

Birds banded

- 567 *Querquedula cyanoptera* Mouth of Bear River Utah, Sept. 16, 1911
 568 *Dafila acuta* ♂
 569 *Nettion carolinense*
 570 *Dafila acuta* ♀
 571 " " ♂
 572 " " ♂
 573 *Nettion carolinense*
 574 *Dafila acuta* ♂
 575 *Anas platyrhynchos* ♂
 576 *Dafila acuta* ♂
 577 *Nettion carolinense*
 578 *Dafila acuta* ♂
 579 " " ♂
 580 *Anas platyrhynchos* ♂
 581 " " ♀
 582 *Dafila acuta* ♀
 583 *Anas platyrhynchos* ♂
 584 " " ♂
 585 *Dafila acuta* ♀
 586 " " ♂
 587 *Querquedula cyanoptera*
 588 *Anas platyrhynchos*
 589 *Dafila acuta* ♀
 590 " " ♂
 591 *Anas platyrhynchos* ♂
 592 *Nettion carolinense*
 593 *Dafila acuta* ♂
 594 *Anas platyrhynchos* ♂
 595 *Dafila acuta* ♂
 596 *Anas platyrhynchos* ♂
 597 *Querquedula cyanoptera*
 598 *Dafila acuta* ♂
 599 " " ♂

- 600 *Dafila acuta* ♂ Mouth of Bear River Utah, Sept. 16, 1914.
 601 " " ♂ " " " " " 18 "
 602 *Recurvirostra americana* " " " " Sept. 23, 1914
 603 " " " " " " "
 604 " " " " " " "
 605 *Spatula clypeata* " " " " "
 606 " " " " " " "
 607 " " " " " " "
 608 *Querquedula cyanoptera* " " " " "
 609 *Nettion carolinense* " " " " "
 610 " " " " " " "
 611 " " " " " " "
 612 " " " " " " "
 613 *Querquedula cyanoptera* " " " " "
 614 *Nettion carolinense* " " " " "
 615 " " " " " " "
 616 " " " " " " "
 617 " " " " " " "
 618 " " " " " " "
 619 " " " " " " "
 620 " " " " " " "
 621 " " " " " " "
 622 *Spatula clypeata* " " " " "
 623 *Nettion carolinense* " " " " "
 624 " " " " " " "
 625 " " " " " " "
 626 " " " " " " "
 627 *Dafila acuta* " " " " "
 628 " " " " " " "
 629 " " " " " " "
 630 " " " " " " "
 631 " " " " " " "
 632 " " " " " " "

633	<i>Anas platyrhynchos</i>	♂	Mouth of Bear River, Utah, &	1914 Sept 23,
634	<i>Dafila acuta</i>	♀	"	"
635	"	♀	"	"
636	<i>Chauleasmus streperus</i>	♂	"	"
637	<i>Anas platyrhynchos</i>	♀	"	"
638	"	♂	"	"
639	<i>Dafila acuta</i>	♀	"	"
640	"	♀	"	"
641	"	♀	"	"
642	"	♂	"	"
643	<i>Anas platyrhynchos</i>	♂	"	"
644	"	♀	"	"
645	<i>Chauleasmus streperus</i>	♂	"	"
646	<i>Dafila acuta</i>	♀	"	"
647	<i>Nestor carolinensis</i>		"	Sept. 24, 1914
648	"		"	"
649	"		"	"
650	"		"	"
651	"		"	"
652	"		"	"
653	"		"	"
654	"		"	"
655	"		"	"
656	"		"	"
657	"		"	"
658	"		"	"
659	"		"	"
660	"		"	"
661	"		"	"
662	"		"	"
663	"		"	"
664	"		"	"
665	<i>Dafila acuta</i>	♀	"	"

666	Anas platyrhynchos	♂	Mouth of Bear River, Utah	Sept. 24, 1914
667	"	♂	"	"
668	"	♂	"	"
669	"	♂	"	"
670	"	♂	"	"
671	"	♂	"	"
672	"	♂	"	"
673	Dafila acuta	♀	"	"
674	"	♂	"	"
675	Anas platyrhynchos	♀	"	"
676	Dafila acuta	♂	"	"
677	"	♂	"	"
678	"	♀	"	"
679	"	♀	"	"
680	"	♂	"	"
681	"	♂	"	"
682	Egretta c. candidissima		"	"
683	"		(healthy bird)	Sept. 25, 1914
684	Fulica americana		"	"
685	Nuttallia carolinensis		Mouth of Bear River Utah	"
686	Dafila acuta	♀	"	"
687	"	♂	"	"
688	"	♂	"	"
689	"	♀	"	"
690	"	♀	"	"
691	Anas platyrhynchos	♂	"	"
692	"	♂	"	"
693	"	♂	"	"
694	"	♂	"	"
695	"	♂	"	"
696	"	♀	"	"
697	"	♂	"	"
698	"	♀	"	"

699	<i>Anas platyrhynchos</i>	♂	Mouth Bear River Utah	Sept. 25, 1914
700	<i>Dafila acuta</i>	♂	"	"
701	<i>Himantopus mexicanus</i>		"	Sept. 28, 1914
702	<i>Egretta c. candidissima</i>		"	"
703	<i>Spatula clypeata</i>	♂	"	"
704	<i>Nettion carolinense</i>		"	"
705	"	"	"	"
706	<i>Dafila acuta</i>	♂	"	"
707	<i>Mareca americana</i>	♂	"	"
708	<i>Dafila acuta</i>	♂	"	"
709	"	♀	"	"
710	"	♀	"	"
711	<i>Chauleasmus streperus</i>		"	"
712	<i>Dafila acuta</i>	♂	"	"
713	"	♀	"	"
714	"	♂	"	"
715	<i>Anas platyrhynchos</i>	♂	"	"
716	<i>Dafila acuta</i>	♀	"	"
717	"	♀	"	"
718	"	♀	"	"
719	"	♀	"	"
720	"	♀	"	"
721	"	♀	"	"
722	"	♀	"	"
723	"	♂	"	"
724	"	♀	"	"
725	"	♂	"	"
726	"	♂	"	"
727	"	♂	"	"
728	"	♂	"	"
729	"	♀	"	"
730	"	♂	"	"
731	"	♂	"	"

732 *Dafila acuta* ♀ Mouth of Bear River Utah, Sept. 28, 1914

733 " " ♀ " " "

734 " " ♂ " " "

735 " " ♂ " " "

736 " " ♂ " " "

737 " " ♀ " " "

738 " " ♀ " " "

739 " " ♀ " " "

740 " " ♀ " " "

741 " " ♂ " " "

742 " " ♀ " " "

743 " " ♀ " " "

744 " " ♀ " " "

745 " " ♀ " " "

746 " " ♂ " " "

747 " " ♂ " " "

748 " " ♂ " " "

749 " " ♀ " " "

750 " " ♀ " " "

751 " " ♂ " " "

752 " " ♂ " " "

753 *Nettion carolinense* " Sept 29, 1914

754 " " " " "

755 " " " " "

756 " " " " "

757 *Dafila acuta* ♂ " " "

758 *Anas platyrhynchos* ♂ " " "

759 *Spatula dyspeata* ♂ " " "

760 *Dafila acuta* ♂ " " "

761 " " ♂ " " "

762 " " ♀ " " "

763 " " ♀ " " "

764 " " ♂ " " "

1914
765 *Nethion carolinense* Mouth of Bear River Utah Sept 29
766 " " " " "

Banded Birds recaptured & released at
Bear River Laboratory.

9040 Aug. 15. 1915

794²

780², 786², 792², 794³, 798, 901 Aug. 16, 1915

770, 781, 782,

" " "

786, 790, 794, 798, 901

" 17 "

776, 786, 794

" 18 "

794

" 21 "

914, 917, 920, 928, 930

" 23 "

929

" 25 "

929

" 26 "

929, 911, 794.

" 27 "

FIRST NATIONAL BANK OF LAS VEGAS
EAST LAS VEGAS, N. M.

Released Sept. 4, 1916
Killed Jan. 29, 1918
Band much worn.







U. S. DEPARTMENT OF AGRICULTURE
Office of the Secretary
Press Service



*Mr. Solomon
Dr. Wetmore*

Release - Immediate

May 11, 1923.

FOLLOWING THE FLIGHT OF BIRDS.

Sportsmen, ornithologists, and others interested in bird migration and the protection of game birds will find information of value in a new United States Department of Agriculture Bulletin, 1145, Migration Records from Wild Ducks and Other Birds Banded in the Salt Lake Valley, Utah, by Alexander Wetmore, assistant biologist, Bureau of Biological Survey.

Bands were placed on 1,241 individuals of 23 species of birds, the majority on wild ducks of 9 species. Returns were received from 12 species. Of these, 185 birds were retaken out of 1,195 banded.

Many mallards apparently remain in ponds and channels kept open by the inflow of spring water after the more extensive bodies of water are closed by ice. Such birds pass north in suitable localities as far as the Snake River in Idaho. The majority of green-winged teals, cinnamon teals, and spoonbills seem to leave Utah to winter in California. Part of the pintails, after leaving Utah, go to California to winter in the interior valleys, while others cross to the Great Plains and go southward to the Gulf Coast in Texas. The spring migration carries the latter birds northward through the plains again, and eastward as far as western Missouri and north at least into southern Canada.

Details concerning the returns on gadwalls, redheads, white-faced glossy ibises, great blue herons, snowy herons, American coots, and a double crested cormorant are included in the record in tabulated form. As an example of how some of these returns come in may be cited the case of a Mexican peon at Mexcaltitan, Territory of Tepic, Mexico, who brought a bit of aluminum to a Japanese labor contractor, saying he had found it on the leg of a heron that he had killed and eaten. The band was returned to the Biological Survey, at Washington, D.C.

//

1090-23

Table 1.--Record of Returns for banded Mallards.

Date released ^{1/}	Date recovered	State	Place recovered
			Locality
Sept. 16, 1914	Fall, 1914 ^{2/}	Utah	Mouth of Bear River ^{3/}
" 25, "	" "	"	" " " "
" 17, 1916	Nov. 28, 1916	"	" " " "
" 28, "	" 12, "	"	" " " "
" " "	" " "	"	" " " "
Oct. 25 "	" 15, "	"	" " " "
Sept. 16, 1914	Dec. 28, 1914	"	On Logan River, Cache Valley, near Log
" 23, "	Oct. 9, "	"	Two miles east of Tremonton.
" 25, "	Nov. 29, "	"	At Utah Lake, three miles southwest of Provo.
Sept. 5, 1915	Nov. 7, 1915	"	Two miles south of Thatcher.
" 14, "	" 26, "	"	Five miles southwest of Logan.
Aug. 27, 1916	Dec. 31, 1916	"	On Sevier River, seven miles north of Delta.
Sept. 7, 1916	Oct. 9, 1916	"	Three miles southwest of Tremonton.
" 28, "	Dec. 13, "	"	On Bear River, near Collinston.
" 29, "	Nov. 10, "	"	West Lakes near Salt Lake City.
" 23, 1914	Jan. 14, 1915	Idaho	Pebble, Bannock Co.
" 24, "	Nov. 15, 1914	"	On Snake River, Fremont County.
June 17, 1915	Jan. 19, 1917	"	Near Stone.
Sept. 24, 1914	Oct. 16, 1916	California	Nine miles south of Bishop.
" 25, "	Mar. 1, 1915	New Mexico	Newman Ranch, near Newman, 35 miles northeast of El Paso, Texas.
" 23, "	Dec. 28, 1915	Texas	Twenty-five miles west of Houston.

^{1/} All mallards were banded and released near the mouth of Bear River, Utah.

^{2/} This bird and the one following were killed sometime after November 1 of the same year in which they were marked.

^{3/} The band of one mallard killed here during the late fall of 1915 was lost so that information as to date of banding is not available.

Table 2.--Record of Returns for Banded Gadwall.

Date ¹ / _{released}	Date recovered	State	Place recovered
			Locality
Sept. 11, 1915	Oct. 1, 1915	Utah	Mouth of Bear River. ² /
" " "	" 1-8, "	"	" " " "
Aug. 27, 1916	Oct. 12, 1916 ³ /	"	Below Willard.

¹/ All gadwall were banded and released near the mouth of Bear River, Utah.

²/ The band taken from one gadwall killed in the fall of 1915 was lost before the number was recorded. This bird may have been released during 1915 or may have been one of three marked the previous year.

³/ Approximate date.

Table 3.--Record of Returns for Banded Green-winged Teal.

Date ¹ released	Date recovered	State	Place recovered Locality
Sept. 16, 1914	Oct. 7, 1914 ²	Utah	Mouth of Bear River.
" 23, "	Nov. 24, "	"	" " " "
" " "	" 26, " ²	"	" " " "
" 24, "	Oct. 10, " ²	"	" " " "
" " "	" " "	"	" " " "
" 26, 1915	" 20, 1916	"	" " " "
" 28, "	" 1-8, 1915	"	" " " "
" 2, 1916	" 1, 1916 ²	"	" " " "
" 7, "	Nov. 1, " ²	"	2 " " "
" 11, "	" 17, "	"	" " " "
" " "	Oct. 20, "	"	" " " "
" " "	" 25, " ²	"	" " " "
" 17, "	" 20, 1917 ²	"	" " " "
" 20, "	" 2, 1916	"	" " " "
" " "	" 21, "	"	" " " "
" 25, "	" 20, "	"	" " " "
" 29, "	" 9, "	"	" " " "
" " "	" 4, "	"	" " " "
" 30, "	" 10, "	"	" " " "
Oct. 3, 1916	Nov. 16, 1916	"	" " " "
" 15, "	Oct. 29, "	"	" " " "
" 23, "	Nov. 20, "	"	" " " "
" 24, "	Oct. 31, "	"	" " " "
Sept. 16, 1914	Dec. 21, 1914	"	New Moon Gun Club, near Salt Lake City.
" 26, 1915	" " 1915	"	Near mouth of Jordan River.
" 11, 1916	Oct. 20, 1916	"	Sloughs west of Salt Lake City.
" 20, "	Nov. 17, "	"	Junction of Mill Creek and Jordan River, near Salt Lake City.
Oct. 10, 1916 ³	Oct. 12, 1916	"	Utah Lake, near Geneva.
Sept. 30, 1916	Nov. 1, "	"	North channel at mouth of Weber River.
Oct. 23, "	" 13, "	"	Mouth of Weber River.
Sept. 20, "	Jan. 28, 1917	California	Yolo County, 5 miles from Sacramento
" 23, 1914	Jan. 17, 1915	"	One mile from Clarksburg, Yolo County.

¹ All banded and released at the mouth of Bear River, Utah, unless otherwise indicated.

² Approximate date.

³ Released near Geneva, Utah on Utah Lake.

Table 3.--con't.

Date ¹ released	Date recovered	State	Place recovered Locality
Sept. 2, 1916	Jan. 27, 1917	California	Near Rutherford.
" 16, 1914	Oct. 16, 1916	"	Harvey Gun Club grounds at junction of Cordelia and Suisun Sloughs.
" " "	Jan. 17, 1915	"	Near Gustin, Merced Co.
" 30, 1916	" 28, 1917	"	Near Ingomar, Merced Co.
" " "	" 27, 1918	"	Near Los Banos.
" 29, "	Dec. 10, 1916	"	Seven miles southeast of Los Banos.
" 11, "	" 16, "	"	Eight miles southeast of Los Banos.
" 14, 1915	Jan. 10, 1917	"	Near Los Banos.
Oct. 3, 1916	Dec. 2, 1916	"	Near Brito, Merced County.
Sept. 30, "	Jan. 28, 1917	"	" " " "
Oct. 23, "	Dec. 10, 1916	"	Mouth of Pajaro River near Watsonville, Santa Cruz County.
Sept. 7, 1916	Dec. 27, 1916	"	Near Maricopa, Kern County.
" 16, 1914	" 12, 1915	"	Near Porterville.
" 26, 1915	Jan. 16, 1916	"	Twelve miles northwest of Wasco, Kern County (Section 13, Township 25, South Range 23, East).
Sept. 23, 1914	Jan. 6, 1916	"	Semitropic.
Aug. 20, 1916	Dec. 20, "	"	On holdings of Chico Land and Water Co. Orange County, 33 miles below Los Angeles.
Sept. 16, 1914	Nov. 17, 1915	"	Gun Club of Christopher Land and Water Company, between Santa Ana and Sunset Beach, Orange County.
Sept. 28, 1915	Dec. 19, 1915	Arizona	Near Miami.
" 30, 1916	March, 1917	Colorado	Near Sanford, Conejos County.

¹ All banded and released at the mouth of Bear River, Utah, unless otherwise indicated.

Table 4.--Record of Returns for Banded Shovellers.

Date ¹ released	Date recovered	State	Place recovered Locality
Sept. 29, 1914	Oct. 17, 1914	Utah	Mouth of Bear River.
" 1, 1916	" 12, 1916	"	" " " "
" 25, "	" 7, "	"	" " " "
" 28, "	" 1, "	"	" " " "
" " "	" 8, "	"	" " " "
" " "	" 7, "	"	" " " "
" " "	" 21, "	"	Mouth of Weber River.
" 29, "	" 20, " ²	"	Mouth of Jordan River.
" 1, "	" 28, 1917	California	Near Vallejo.

¹ All banded and released at the mouth of Bear River, Utah.

² Approximate date.

Table 5.--Record of Returns for Banded Pintails.

Date ¹ released	Date recovered	State	Place recovered Locality
Sept. 16, 1914	Oct. 10, 1914	Utah	Mouth of Bear River, Utah.
" " "	" " "	"	" " " " "
" 23, "	Late fall, "	"	" " " " "
" 27, 1916	Oct. 12, 1916 ²	"	" " " " "
" 17, "	" 4, "	"	" " " " "
Oct. 10, "	April, 1917	"	" " " " "
" 15, "	Oct. 15, 1916 ⁴	"	" " " " "
Sept. 28, 1914	Oct. 9, 1914 ²	"	Near Bear River City, Boxelder County.
" " "	" 18, "	"	Third Creek between Hooper and Warren.
" " "	" 19, "	"	Mouth of Weber River.
" " "	Nov. 14, "	"	Central Gun Club, west of Salt Lake City
Oct. 10, 1916 ³	" 15, "	"	Black Marsh, near Salt Lake City.
" " " ³	Oct. 24, 1916	"	Four miles north of Brigham City.
" " " ³	Nov. 15, "	"	Mouth of Jordan River.
Sept. 29, "	Late Nov., 1920	"	" " " "
" 16, 1914	Apr. 13, 1916	Saskatchewan	Near Expanse.
Aug. 20, 1916	Date uncertain	"	Estevan
Sept. 4, "	Sept. 15, 1916	Montana	Mahon-Hoyt reservoir, six miles south-east of Glasgow.
Sept. 16, 1914	Nov. 4, 1916 ⁶	Nebraska	Fourteen miles north of Hyamis.
" " "	Date uncertain ⁶	Oklahoma	Near Elmer, Jackson County.
" 23, "	Feb. 1, 1915 ²	"	Salt Plains of Alfalfa County.
" 28, "	Jan. 26, "	Missouri	Two miles north of Asbury.
" 25, "	" " 1917	Texas	Near Markham, Matagorda County.
Aug. 20, 1916	Feb. 25, "	"	Olton, Lamb County.
Sept. 4, "	Jan. 29, "	New Mexico	Arroyo Pecos, two and one-half miles south of Las Vegas.
Aug. 27, 1916	December, 1916	Arizona	Near Show Low.
" " "	Dec. 5, 1917	California	Near Eden.
Sept. 17, ³	Nov. 20, 1916	"	Near Cordelia, Solano County.
Oct. 10, ³	Nov. 13, 1918	"	Near Alvarado.
Aug. 20, 1916	Oct. 16, 1916	"	Near Dos Palos.
" " "	Jan. 29, 1917	"	Near Brito, Merced County.
Sept. 16, 1914	" 24, 1915	"	Fresno County.
Aug. 27, 1916	" 27, 1918	"	Buena Vista Lake near Bakersfield.
Sept. 28, 1914	Dec. 2-8, 1917	"	Imperial Valley south of Calipatria.

¹ All banded and released at the mouth of Bear River Utah, unless otherwise indicated.

² Approximate date.

³ Released near Geneva, on Utah Lake, Utah.

⁴ Killed by a hunter within one hour after release.

⁵ Reported Dec. 5, 1917.

⁶ Reported March 6, 1915, as killed "some time ago."

Redheads

Table 6.--Record of Returns for Banded Pintails.

Date released ¹	Date recovered	State	Place recovered Locality
Aug. 15, 1915	Oct. 2, 1915	Utah	Mouth of Bear River.
Sept. 3, "	" 1-8, "	"	" " " "
" 14, "	" " "	"	" " " "
" 20, "	" 17, "	"	" " " "
" 25, "	" 3, "	"	" " " "
" " "	" 1-8, "	"	" " " "
" " "	" " "	"	" " " "
" " "	" " "	"	" " " "
" " "	" 1, "	"	" " " "
" 28, "	" 1-6, "	"	" " " "
" " "	" " "	"	" " " "
" " "	October, 1915	"	" " " "
Aug. 25, 1916	Oct. 7, 1916	"	" " " "
Sept. 2, "	" 20, "	"	" " " "
" 4, "	" 10, "	"	" " " "
" 5, "	October, 1916	"	" " " "
" 7, "	Oct. 2, 1916	"	" " " "
" " "	" 8, "	"	" " " "
" 8, "	Nov. 12, "	"	" " " "
" " "	Sept. 28, "	"	" " " "
" " "	Oct. 22, "	"	" " " "
" " "	Sept. 29, "	"	" " " "
" 27, "	Oct. 5, "	"	" " " "
" " "	" 2, "	"	" " " "
" " "	Nov. 12, "	"	" " " "
" " "	Oct. 21, "	"	" " " "
Oct. 15, "	Nov. 5, "	"	" " " "
" 21, "	" " "	"	" " " "
Aug. 22, 1915	Oct. 1, 1915	"	Four miles west of Logan.
Sept. 7, 1916	Nov. 22, 1916	"	Near Honeyville.
" " "	Oct. 11, "	"	Salt Creek, near Tremonton.
" 17, "	" 7, "	"	Three miles east of Tremonton.
" 4, "	" 8, "	"	Near Bear River City.
" 4, "	" 17, "	"	" " " "
" 17, "	Nov. 18, "	"	Near Hot Springs, Boxelder County.
" 4, "	Oct. 29, "	"	Mouth of Weber River.
" " "	" 20, "	"	Near Syracuse, Davis County.
" 7, "	" 14, "	"	" " " "
" " "	" " "	"	" " " "

¹

All banded and released at mouth of Bear River, Utah.

²

This bird and the one preceding, banded and released at the same time, when killed were still in company.

Table 6.--con't.

Date released	Date recovered	State	Place recovered locality
Aug. 28, 1916	Oct. 2, 1916	Utah	Sloughs west of Salt Lake City.
Sept. 4, "	" " "	"	" " " " " "
Aug. 27, "	Nov. 14, "	"	Vicinity of Magna, near Salt Lake City.
Aug. 22, 1915	Dec. 24, 1915	"	Harrows of Jordan River, 20 miles south of Salt Lake City.
" 15, "	Oct. 1, "	"	Three miles west of Gunnison.
" 27, 1916	" " 1916	Idaho	Mud Lake, near Hamer.
" 20, "	Dec. 6, 1918	"	Tanner Field Lake, Bingham County.
Sept. 4, 1916	Oct. 15, 1916	"	Blackfoot Swamp, 12 miles north of Soda Springs.
" 27, "	Nov. 27, 1916	Colorado	Ordway Lakes, near Ordway.
Aug. 20, "	Apr. 21, 1917	Kansas	Near Nashville, Kingman County.
Oct. 25, "	Nov. 22, 1916	Texas	Near O'Donnell, Dawson County.
Fall, 1916 ⁴	Jan. 25, 1919	Arizona	Florence Reservoir, near Florence.

³ This bird and the one preceding killed at the same time and place.

⁴ Released between August 27 and September 27.

Table 1.--Record of Returns for banded Mallards.

Date released ¹	Date recovered	State	Place recovered
			Locality ³
Sept. 16, 1914	Fall, 1914 ²	Utah	Mouth of Bear River
" 25, "	" "	"	" " " "
" 17, 1916	Nov. 28, 1916	"	" " " "
" 28, "	" 12, "	"	" " " "
" " "	" " "	"	" " " "
Oct. 23 "	" 15, "	"	" " " "
Sept. 16, 1914	Dec. 28, 1914	"	On Logan River, Cache Valley, near Logan
" 23, "	Oct. 9, "	"	Two miles east of Tremonton.
" 25, "	Nov. 29, "	"	At Utah Lake, three miles southwest of Provo.
Sept. 5, 1915	Nov. 7, 1915	"	Two miles south of Thatcher.
" 14, "	" 26, "	"	Five miles southwest of Logan.
Aug. 27, 1916	Dec. 31, 1916	"	On Sevier River, seven miles north of Delta.
Sept. 7, 1916	Oct. 9, 1916	"	Three miles southwest of Tremonton.
" 28, "	Dec. 13, "	"	On Bear River, near Collinston.
" 29, "	Nov. 10, "	"	West Lakes near Salt Lake City.
" 23, 1914	Jan. 14, 1915	Idaho	Pebble, Bannock Co.
" 24, "	Nov. 15, 1914	"	On Snake River, Fremont County.
June 17, 1915	Jan. 19, 1917	"	Near Stone.
Sept. 24, 1914	Oct. 16, 1916	California	Nine miles south of Bishop.
" 25, "	Mar. 1, 1915	New Mexico	Newman Ranch, near Newman, 35 miles northeast of El Paso, Texas.
" 23, "	Dec. 28, 1915	Texas	Twenty-five miles west of Houston.

¹ All mallards were banded and released near the mouth of Bear River, Utah.

² This bird and the one following were killed sometime after November 1 of the same year in which they were marked.

³ The band of one mallard killed here during the late fall of 1915 was lost so that information as to date of banding is not available.

Table 2.--Record of Returns for Banded Gadwall.

Date ¹ / _{released}	Date recovered	State	Place recovered
			Locality
Sept. 11, 1915	Oct. 1, 1915	Utah	Mouth of Bear River. ² /
" " "	" 1-8, "	"	" " " "
Aug. 27, 1916	Oct. 12, 1916 ³ /	"	Below Willard.

¹/ All gadwall were banded and released near the mouth of Bear River, Utah.

²/ The band taken from one gadwall killed in the fall of 1915 was lost before the number was recorded. This bird may have been released during 1915 or may have been one of three marked the previous year.

³/ Approximate date.

Table 3.--Record of Returns for Banded Green-winged Teal.

Date ¹ / _{released}	Date recovered	State	Place recovered Locality
Sept. 16, 1914	Oct. 7, 1914 ²	Utah	Mouth of Bear River.
" 23, "	Nov. 24, "	"	" " " "
" " "	" 26, " ²	"	" " " "
" 24, "	Oct. 10, " ²	"	" " " "
" " "	" " "	"	" " " "
" 26, 1915	" 20, 1916	"	" " " "
" 26, "	" 1-8, 1915	"	" " " "
" 2, 1916	" 1, 1916 ²	"	" " " "
" 7, "	Nov. 1, "	"	2 " " "
" 11, "	" 17, "	"	" " " "
" " "	Oct. 20, "	"	" " " "
" " "	" 25, " ²	"	" " " "
" 17, "	" 20, 1917 ²	"	" " " "
" 20, "	" 2, 1916	"	" " " "
" " "	" 21, "	"	" " " "
" 25, "	" 20, "	"	" " " "
" 29, "	" 9, "	"	" " " "
" " "	" 4, "	"	" " " "
" 30, "	" 10, "	"	" " " "
Oct. 3, 1916	Nov. 16, 1916	"	" " " "
" 15, "	Oct. 29, "	"	" " " "
" 23, "	Nov. 20, "	"	" " " "
" 24, "	Oct. 31, "	"	" " " "
Sept. 16, 1914	Dec. 21, 1914	"	New Moon Gun Club, near Salt Lake City.
" 26, 1915	" " 1915	"	Near mouth of Jordan River.
" 11, 1916	Oct. 20, 1916	"	Sloughs west of Salt Lake City.
" 20, "	Nov. 17, "	"	Junction of Mill Creek and Jordan River, near Salt Lake City.
Oct. 10, 1916 ³	Oct. 12, 1916	"	Utah Lake, near Geneva.
Sept. 30, 1916	Nov. 1, "	"	North channel at mouth of Weber River.
Oct. 23, "	" 13, "	"	Mouth of Weber River.
Sept. 20, "	Jan. 28, 1917	California	Yolo County, 5 miles from Sacramento
" 23, 1914	Jan. 17, 1915	"	One mile from Clarksburg, Yolo County.

¹/
All banded and released at the mouth of Bear River, Utah, unless otherwise indicated.

²/
Approximate date.

³/
Released near Geneva, Utah on Utah Lake.

Table 3.--con't.

Date ¹ released	Date recovered	State	Place recovered
			Locality
Sept. 2, 1916	Jan. 27, 1917	California	Near Rutherford.
" 16, 1914	Oct. 16, 1916	"	Harvey Gun Club grounds at junction of Cordelia and Suisun Sloughs.
" " "	Jan. 17, 1915	"	Near Gustin, Merced Co.
" 30, 1916	" 28, 1917	"	Near Ingomar, Merced Co.
" " "	" 27, 1918	"	Near Los Banos.
" 29, "	Dec. 10, 1916	"	Seven miles southeast of Los Banos.
" 11, "	" 16, "	"	Eight miles southeast of Los Banos.
" 14, 1915	Jan. 10, 1917	"	Near Los Banos.
Oct. 3, 1916	Dec. 2, 1916	"	Near Brito, Merced County.
Sept. 30, "	Jan. 28, 1917	"	" " " "
Oct. 23, "	Dec. 10, 1916	"	Mouth of Pajaro River near Watsonville, Santa Cruz County.
Sept. 7, 1916	Dec. 27, 1916	"	Near Maricopa, Kern County.
" 16, 1914	" 12, 1915	"	Near Porterville.
" 26, 1915	Jan. 16, 1916	"	Twelve miles northwest of Wasco, Kern County (Section 13, Township 25, South Range 23, East).
Sept. 23, 1914	Jan. 6, 1916	"	Semitropic.
Aug. 20, 1916	Dec. 20, "	"	On holdings of Chico Land and Water Co., Orange County, 33 miles below Los Angeles.
Sept. 16, 1914	Nov. 17, 1915	"	Gun Club of Christopher Land and Water Company, between Santa Ana and Sunset Beach, Orange County.
Sept. 26, 1915	Dec. 19, 1915	Arizona	Near Miami.
" 30, 1916	March, 1917	Colorado	Near Sanford, Conejos County.

¹ All banded and released at the mouth of Bear River, Utah, unless otherwise indicated.

Table 4.--Record of Returns for Banded Shovellers.

Date ¹ / released	Date recovered	State	Place recovered Locality
Sept. 29, 1914	Oct. 17, 1914	Utah	Mouth of Bear River.
" 1, 1916	" 12, 1916	"	" " " "
" 25, "	" 7, "	"	" " " "
" 28, "	" 1, "	"	" " " "
" " "	" 8, "	"	" " " "
" " "	" 7, "	"	" " " "
" " "	" 21, "	"	Mouth of Weber River.
" 29, "	" 20, " ² / 	"	Mouth of Jordan River.
" 1, "	" 28, 1917	California	Near Vallejo.

¹/
All banded and released at the mouth of Bear River, Utah.

²/
Approximate date.

Table 5.--Record of Returns for Banded Pintails.

Date ¹ released	Date recovered	State	Place recovered Locality
Sept. 16, 1914	Oct. 10, 1914	Utah	Mouth of Bear River, Utah.
" " "	" " "	"	" " " " "
" 23, "	Late fall, "	"	" " " " "
" 27, 1916	Oct. 12, 1916 ²	"	" " " " "
" 17, "	" 4, "	"	" " " " "
Oct. 10, "	April, 1917 ⁴	"	" " " " "
" 15, "	Oct. 15, 1916 ²	"	" " " " "
Sept. 28, 1914	Oct. 9, 1914	"	Near Bear River City, Boxelder County.
" " "	" 18, "	"	Third Creek between Hooper and Warren.
" " "	" 19, "	"	Mouth of Weber River.
" " "	Nov. 14, "	"	Central Gun Club, west of Salt Lake City
Oct. 10, 1916 ³	" 15, "	"	Black Marsh, near Salt Lake City.
" " " ³	Oct. 24, 1916	"	Four miles north of Brigham City.
" " " ³	Nov. 15, "	"	Mouth of Jordan River.
Sept. 29, "	Late Nov., 1920	"	" " " "
" 16, 1914	Apr. 13, 1916	Saskatchewan	Near Expanse.
Aug. 20, 1916	Date uncertain	"	Estevan
Sept. 4, "	Sept. 15, 1916	Montana	Mahon-Hoyt reservoir, six miles south-east of Glasgow.
Sept. 16, 1914	Nov. 4, 1916 ⁶	Nebraska	Fourteen miles north of Hyamis.
" " "	Date uncertain ⁶	Oklahoma	Near Elmer, Jackson County.
" 23, "	Feb. 1, 1915 ²	"	Salt Plains of Alfalfa County.
" 28, "	Jan. 26, "	Missouri	Two miles north of Asbury.
" 25, "	" " 1917	Texas	Near Markham, Matagorda County.
Aug. 20, 1916	Feb. 25, "	"	Olton, Lamb County.
Sept. 4, "	Jan. 29, "	New Mexico	Arroyo Pecos, two and one-half miles south of Las Vegas.
Aug. 27, 1916	December, 1916	Arizona	Near Show Low.
" " "	Dec. 5, 1917	California	Near Eden.
Sept. 17, ³	Nov. 20, 1916	"	Near Cordelia, Solano County.
Oct. 10, ³	Nov. 13, 1918	"	Near Alvarado.
Aug. 20, 1916	Oct. 16, 1916	"	Near Dos Palos.
" " "	Jan. 29, 1917	"	Near Brito, Merced County.
Sept. 16, 1914	" 24, 1915	"	Fresno County.
Aug. 27, 1916	" 27, 1918	"	Buena Vista Lake near Bakersfield.
Sept. 28, 1914	Dec. 2-8, 1917	"	Imperial Valley south of Calipatria.

¹ All banded and released at the mouth of Bear River Utah, unless otherwise indicated.

² Approximate date.

³ Released near Geneva, on Utah Lake, Utah.

⁴ Killed by a hunter within one hour after release.

⁵ Reported Dec. 5, 1917.

⁶ Reported March 6, 1915, as killed "some time ago."

Redheads
Table 6.--Record of Returns for Banded Pintails.

Date ¹ / _{released}	Date recovered	State	Place recovered Locality
Aug. 15, 1915	Oct. 2, 1915	Utah	Mouth of Bear River.
Sept. 3, "	" 1-8, "	"	" " " "
" 14, "	" " "	"	" " " "
" 20, "	" 17, "	"	" " " "
" 25, "	" 3, "	"	" " " "
" " "	" 1-8, "	"	" " " "
" " "	" " "	"	" " " "
" " "	" " "	"	" " " "
" " "	" 1, "	"	" " " "
" 26, "	" 1-8, "	"	" " " "
" " "	" " "	"	" " " "
" " "	October, 1915	"	" " " "
Aug. 25, 1916	Oct. 7, 1916	"	" " " "
Sept. 2, "	" 20, "	"	" " " "
" 4, "	" 10, "	"	" " " "
" 8, "	October, 1916	"	" " " "
" 7, "	Oct. 2, 1916	"	" " " "
" " "	" 8, "	"	" " " "
" 8, "	Nov. 12, "	"	" " " "
" " "	Sept. 28, "	"	" " " "
" " "	Oct. 22, "	"	" " " "
" " "	Sept. 29, "	"	" " " "
" 27, "	Oct. 5, "	"	" " " "
" " "	" 2, "	"	" " " "
" " "	Nov. 12, "	"	" " " "
" " "	Oct. 21, "	"	" " " "
Oct. 15, "	Nov. 5, "	"	" " " "
" 21, "	" " "	"	" " " "
Aug. 22, 1915	Oct. 1, 1915	"	Four miles west of Logan.
Sept. 7, 1916	Nov. 22, 1916	"	Near Honeyville.
" " "	Oct. 11, "	"	Salt Creek, near Tremonton.
" 17, "	" 7, "	"	Three miles east of Tremonton.
" 4, "	" 8, "	"	Near Bear River City.
" 4, "	" 17, "	"	" " " "
" 17, "	Nov. 18, "	"	Near Hot Springs, Boxelder County.
" 4, "	Oct. 29, "	"	Mouth of Weber River.
" " "	" 20, "	"	Near Syracuse, Davis County.
" 7, "	" 14, "	"	" " " "
" " "	" " "	"	" " " " ² / _✓

¹/_✓ All banded and released at mouth of Bear River, Utah.

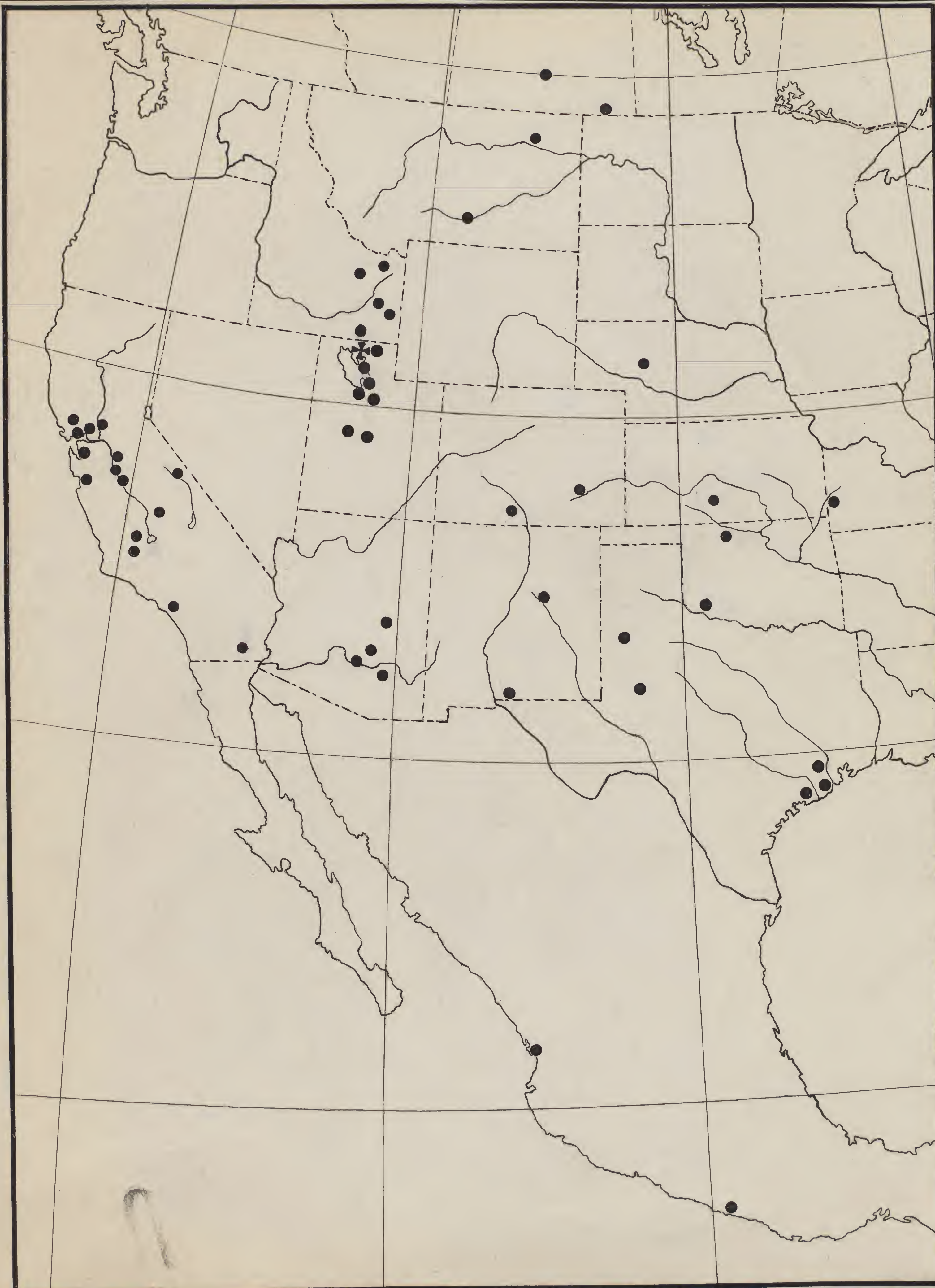
²/_✓ This bird and the one preceding, banded and released at the same time, when killed were still in company.

Table 6.--con't.

Date released	Date recovered	State	Place recovered Locality
Aug. 28, 1916	Oct. 2, 1916	Utah	Sloughs west of Salt Lake City.
Sept. 4, "	" " "	"	" " " " " "
Aug. 27, "	Nov. 14, "	"	Vicinity of Magna, near Salt Lake City.
Aug. 22, 1915	Dec. 24, 1915	"	Narrows of Jordan River, 20 miles south of Salt Lake City.
" 15, "	Oct. 1, "	"	Three miles west of Gunnison.
" 27, 1916	" " 1916	Idaho	Mud Lake, near Hamer.
" 20, "	Dec. 8, 1918	"	Tanner Field Lake, Bingham County.
Sept. 4, 1916	Oct. 15, 1916	"	Blackfoot Swamp, 12 miles north of Soda Springs.
" 27, "	Nov. 27, 1916	Colorado	Ordway Lakes, near Ordway.
Aug. 20, "	Apr. 21, 1917	Kansas	Near Nashville, Kingman County.
Oct. 23, "	Nov. 22, 1916	Texas	Near O'Donnell, Dawson County.
Fall, 1916 ⁴	Jan. 25, 1919	Arizona	Florence Reservoir, near Florence.

³ This bird and the one preceding killed at the same time and place.

⁴ Released between August 27 and September 27.



B2118 M

32118M

A synopsis of return records for the red head follows:

1
UTAH (mouth of Bear River) Banded August 15, 1915; recovered October 2, 1915.

1
All birds banded and released at the mouth of Bear River, Utah.

Banded September 3, 1915; recovered between October 1 and 8, 1915. Banded September 14, 1915; recovered between October 1 and 8, 1915. Banded September 20, 1915; recovered October 17, 1915. Banded September 25, 1915; recovered October 3, 1915. Banded September 25, 1915; recovered between October 1 and 8, 1915 (three birds with identical data). Banded September 25, 1915; recovered October 1, 1915. Banded September 28, 1915; recovered between October 1 and 8, 1915 (two birds with identical data). Banded September 28, 1915; recovered in October, 1915. Banded August 25, 1916; recovered October 7, 1916. Banded September 2, 1916; recovered about October 20, 1916. Banded September 4, 1916; recovered October 10, 1916. Banded September 4, 1916; recovered in October, 1916. Banded September 7, 1916; recovered October 2, 1916. Banded

23

September 7, 1916; recovered October 8, 1916. Banded September 8, 1916; recovered November 12, 1916. Banded September 8, 1916; recovered September 28, 1916. Banded September 8, 1916; recovered October 22, 1916. Banded September 8, 1916; recovered September 29, 1916. Banded September 27, 1916; recovered October 5, 1916. Banded September 27, 1916; recovered October 2, 1916. Banded September 27, 1916; recovered November 12, 1916. Banded September 27, 1916; recovered October 21, 1916. Banded October 15, 1916; recovered November 5, 1916. Banded October 21, 1916; recovered November 5, 1916.

UTAH ^{1/} (other records) Banded August 22, 1915; recovered four miles west of

^{1/} All birds banded and released at the mouth of Bear River, Utah.

Logan, October 1, 1915. Banded September 7, 1916; recovered near Honeyville, November 22, 1916. Banded September 7, 1916; recovered on Salt Creek, near Tremonton, October 11, 1916. Banded September 17, 1916; recovered three miles east of Tremonton, about October 7, 1916. Banded September 4, 1916; recovered near Bear River City, October 8, 1916. Banded September 4, 1916; recovered near Bear River City, October 17, 1916. Banded September 17, 1916; recovered near Hot Springs, Boxelder County, November 18, 1916. Banded September 4, 1916; recovered near the mouth of the Weber River, October 29, 1916. Banded September 4, 1916; recovered near Syracuse, Davis County, October 20, 1916. Banded September 7, 1916; recovered near Syracuse, Davis County, October 14, 1916 (two birds with identical data, released at same time and killed when still in company with one another). Banded August 28, 1916; recovered in the sloughs west of Salt Lake City, October 2, 1916. Banded September 4, 1916; recovered in the sloughs west of Salt Lake City, October 2, 1916 (this bird and the preceding one secured at same time and place).

Banded August 27, 1916; recovered in the vicinity of Magna (near Salt Lake City) about November 14, 1916. Banded August 22, 1915; recovered in the Narrows of the Jordan River, twenty miles south of Salt Lake City, December 24, 1915. Banded August 15, 1915; recovered three miles west of Gunnison, October 1, 1915.

✓¹
IDAHO. Banded August 27, 1916; recovered at Mud Lake, near Hamer, about October 1, 1916, banded August 20, 1916; recovered at ⁿⁿ~~Taxer~~ Field Lake, Bingham County, December 8, 1918. Banded September 4, 1916; recovered at Blackfoot Swamp, twelve miles north of Soda Springs, about October 15, 1916.

✓¹
COLORADO. Banded September 27, 1916; recovered on Ordway Lakes, near Ordway, about November 27, 1916.

✓¹
KANSAS. Banded August 20, 1916; recovered near Nashville, Kingman County, April 21, 1917.

✓¹
TEXAS. Banded October 23, 1916; recovered near O'Donnell, Dawson County, November 22, 1916.

✓¹
ARIZONA. Banded between August 27 and September 27, 1916; recovered on the Florence Reservoir near Florence, January 25, 1919.

✓¹ All birds banded and released at the mouth of Bear River, Utah.

Pintail.

UTAH ^{1/} (mouth of Bear River) Banded September 16, 1914; recovered October

^{1/} All birds banded and released at the mouth of Bear River, Utah, unless otherwise indicated.

10, 1914 (two birds with identical data). Banded September 23, 1914; recovered in late fall, 1914. Banded August 27, 1916; recovered about October 12, 1916. Banded September 17, 1916; recovered October 4, 1916. Banded October 10, 1916 ^{2/}; recovered April, 1917. Banded October 15, 1916;

^{2/} Released near Geneva, Utah, on Utah Lake.

recovered on same date within one hour of time of release.

UTAH ^{1/} (other records) Banded September 28, 1914; recovered near Bear River City, Boxelder County, about October 9, 1914. Banded September 28, 1914; recovered on Third Creek between Hooper and Warren October 18, 1914. Banded September 28, 1914; recovered at mouth of Weber River, October 19, 1914. Banded September 28, 1914; recovered at the Central Gun Club, west of Salt Lake City, November 14, 1914. Banded October 10, 1916 ^{2/}; recovered on Black Marsh near Salt Lake City, about November 15, 1916. Banded October 10, 1916 ^{2/}; recovered four miles north of Brigham City, October 24, 1916. Banded October 10, 1916 ^{2/}; recovered, mouth of the Jordan River, November 15, 1916. Banded September 29, 1916; recovered, mouth of the Jordan River, end of November, 1920.

SASKATCHEWAN. ^{1/} Banded September 16, 1914; recovered near Expanse, April 13, 1916. Banded August 20, 1916; recovered Estevan, date uncertain (reported December 5, 1917).

MONTANA. ^{1/} Banded September 4, 1916; recovered on the Mahon-Hoyt reservoir six miles southeast of Glasgow, September 15, 1916.

19
NEBRASKA.

^{1/} Banded September 16, 1914; recovered fourteen miles north of

^{1/}

All birds banded and released at the mouth of Bear River, Utah, unless otherwise indicated.

Hyannis, Nebraska, November 4, 1916.

OKLAHOMA.

^{1/} Banded September 16, 1914; recovered near Elmer, Jackson Co., Oklahoma, date uncertain (reported March 6, 1915 as killed "some time ago").

Banded September 23, 1914; recovered on the Salt Plains of Alfalfa County, about February 1, 1915.

MISSOURI.

^{1/} Banded September 28, 1914; recovered 2 miles north of Asbury, January 26, 1915.

TEXAS.

^{1/} Banded September 25, 1914; recovered near Markham, Matagorda County, January 26, 1917. Banded August 20, 1916; recovered Olton, Lamb County, February 25, 1917.

NEW MEXICO.

^{1/} Banded September 4, 1916; recovered on the Arroyo Pecos, two and one half miles south of Las Vegas, January 29, 1918.

ARIZONA.

^{1/} Banded August 27, 1916; recovered near Show Low, December, 1916.

CALIFORNIA.

^{1/} Banded August 27, 1916; recovered Eden, December 5, 1917. Banded September 17, 1916; recovered near Cordelia, Solano County, November 20, 1916. Banded October 10, 1916 ^{2/}; recovered near Alvarado, November 13, 1918. Banded

^{2/}

Released near Geneva, Utah, on Utah Lake.

August 20, 1916; recovered near Dos Palos, Merced County, October 16, 1916.

Banded August 20, 1916; recovered near Brito, Merced County, January 29, 1917.

Banded September 16, 1914; recovered in Fresno County, January 24, 1915. Banded

August 27, 1916; recovered at Buena Vista Lake near Bakersfield, January 27,

1918. Banded September 28, 1914; recovered south of Calipatria in the Imperial Valley, between December 2 and 8, 1917.

UTAH ^{1/} (mouth of Bear River) Banded September 29, 1914; recovered October ^{Shoviller.}

^{1/} All birds banded and released at the mouth of Bear River, Utah.

17, 1914. Banded September 1, 1916; recovered October 12, 1916. Banded September 25, 1916; recovered October 7, 1916. Banded September 28, 1916; recovered October 1, 1916. Banded September 28, 1916; recovered October 8, 1916. Banded September 28, 1916; recovered October 7, 1916.

UTAH ^{1/} (other records) Banded September 28, 1916; recovered near the mouth of the Weber River, October 21, 1916. Banded September 29, 1916; recovered near the mouth of the Jordan River, about October 20, 1916.

CALIFORNIA. ^{1/} Banded September 1, 1916; recovered near Vallejo, October 28, 1917.

green-winged teal.

UTAH. (mouth of Bear River) Banded September 16, 1914; recovered about October 7, 1914. Banded September 23, 1914; recovered November 26, 1914. Banded September 23, 1914; recovered November 24, 1914. Banded September 24, 1914; recovered about October 10, 1914 (two individuals with this same record). Banded September 26, 1915; recovered October 20, 1916. Banded September 28, 1915; recovered between October 1 and 8, 1915. Banded September 2, 1916; recovered October 1, 1916. Banded September 7, 1916; recovered about November 1, 1916. Banded September 11, 1916; recovered November 17, 1916. Banded September 11, 1916; recovered October 20, 1916. Banded September 11, 1916; recovered October 25, 1916. Banded September 17, 1916; recovered about October 20, 1917. Banded September 20, 1916; recovered October 2, 1916. Banded September 20, 1916; recovered October 21, 1916. Banded September 25, 1916; recovered October 20, 1916. Banded September 29, 1916; recovered October 9, 1916. Banded September 29, 1916; recovered October 4, 1916. Banded September 30, 1916; recovered October 10, 1916. Banded October 3, 1916; recovered November 16, 1916. Banded October 15, 1916; recovered October 29, 1916. Banded October 23, 1916; recovered about November 20, 1916. Banded October 24, 1916; recovered October 31, 1916.

✓ All birds banded and released at the mouth of Bear River, Utah unless otherwise indicated.

UTAH. (other records)

^{1/} Banded September 16, 1914; recovered at New Moon

^{1/}

All birds banded and released at the mouth of Bear River, Utah unless otherwise indicated.

Gun Club, near Salt Lake City, Utah, December 21, 1914. Banded September 26, 1915; recovered near mouth of Jordan River, Utah, December 21, 1915. Banded September 11, 1916; recovered in sloughs west of Salt Lake City, Utah, October 20, 1916. Banded September 20, 1916; recovered at the junction of Mill Creek and the Jordan River near Salt Lake City, Utah, November 17, 1916. Banded ^{2/} October 10, 1916; recovered on Utah Lake

^{2/}

Released near Geneva, Utah, on Utah Lake.

near Geneva, Utah, October 12, 1916. Banded September 30, 1916; recovered on the north channel at the mouth of the Weber River, Utah, November 1, 1916. Banded October 23, 1916; recovered at the mouth of the Weber River, Utah, November 13, 1916.

CALIFORNIA.

^{1/} Banded September 20, 1916; recovered in Yolo County, five miles from Sacramento, January 28, 1917. Banded September 23, 1914; recovered on Big Lake one mile from Clarksburg, Yolo County, January 17, 1915. Banded September 2, 1916; recovered near Rutherford, January 27, 1917. Banded September 16, 1914; recovered on the Harvey Gun Club Grounds at the junction of Cordelia and Suisun Sloughs, October 16, 1916. Banded September 16, 1914; recovered near Gustin, Merced County, January 17, 1915. Banded September 30, 1916; recovered near Ingomar, Merced County, January 28, 1917. Banded September 30, 1916; recovered near Los Baños, January 27, 1918. Banded September 29, 1916; recovered seven miles southeast of Los

12

Baños December 10, 1916. Banded September 11, 1916; recovered eight miles southeast of Los Baños, December 16, 1916. Banded September 14, 1915; recovered near Los Baños about January 10, 1917. Banded October 3, 1916; recovered near Brito, Merced County, December 2, 1916. Banded September 30, 1916; recovered near Brito, Merced County, January 28, 1917. Banded October 23, 1916; recovered at the mouth of the Pajaro River near Watsonville, Santa Cruz County, December 10, 1916. Banded September 7, 1916; recovered near Maricopa, Kern County, December 17, 1916. Banded September 16, 1914; recovered near Porterville, December 12, 1915. Banded September 26, 1915; recovered twelve miles northwest of Wasco (Section 13, Township 25, South Range 23, East), Kern County, January 16, 1916. Banded September 23, 1914; recovered Semitropic, January 6, 1916. Banded August 20, 1916; recovered on holdings of the Chico Land and Water Co., Orange County, thirty-three miles below Los Angeles, December 20, 1916. Banded September 16, 1914; recovered at the gun club of the Christopher Land and Water Company, Orange County, (between Santa Ana and Sunset Beach) November 17, 1915.

ARIZONA.

✓¹

Banded September 28, 1915; recovered near Miami, December 19,

1915.

COLORADO.

✓¹

Banded September 30, 1916; recovered near Sanford, Conejos County.

March, 1917

✓¹

All birds banded and released at the mouth of Bear River, Utah unless otherwise indicated.

UTAH, ^{1/} (mouth of Bear River) gadwall. Two banded September 11, 1915; recovered respectively October 1, and between October 1 and 8, 1915. Banded August 27, 1916; recovered about October 12, 1916. One whose band was lost before the number was recorded was killed in the fall of 1915. This bird may have been one of three marked the previous year or may have been released during 1915.

^{1/} All birds were banded and released near the mouth of Bear River, Utah.

UTAH. (mouth of Bear River.)¹ Banded ^{Mallard.} September 16, 1914; recovered fall of 1914. (This bird and the one following were killed sometime after November 1 of the same year in which they were marked.) Banded September 25, 1914; recovered fall of 1914. Banded September 17, 1916; recovered November 28, 1916. Banded September 28, 1916; recovered November 12, 1916. Banded September 28, 1916; recovered November 12, 1916. Banded October 23, 1916; recovered November 15, 1916. The band of another ^{mallard} ~~bird~~ killed during the late fall of 1915 was lost so that information as to the date of banding is not available.

¹ All birds were banded and released near the mouth of Bear River, Utah.

UTAH. (other records) Banded ^{1/} September 16, 1914; recovered near Logan, Cache Valley, ~~Utah~~ on Logan River, December 28, 1914. Banded September 23, 1914; recovered two miles east of Tremonton, October 9, 1914. Banded September 25, 1914; recovered Utah Lake, three miles southwest of Provo, November 29, 1914. Banded September 5, 1915; recovered two miles south of Thatcher, November 7, 1915. Banded September 14, 1915; recovered five miles southwest of Logan, November 26, 1915. Banded August 27, 1916; recovered Sevier River, seven miles north of Delta, December 31, 1916. Banded September 7, 1916; recovered three miles southwest of Tremonton, October 9, 1916. Banded September 28, 1916; recovered on Bear River near Collinston, December 13, 1916. Banded, September 29, 1916; recovered on the west lakes near Salt Lake City, November 10, 1916.

IDAHO. Banded ^{1/} September 23, 1914; recovered Pebble, Bannock Co., Idaho, January 14, 1915. Banded September 24, 1914; recovered on Snake River, Fremont County, about November 15, 1914. Banded June 17, 1915; recovered near Stone, January 19, 1917.

CALIFORNIA. Banded ^{1/} September 24, 1914; recovered nine miles south of Bishop October 16, 1916.

NEW MEXICO. Banded ^{1/} September 25, 1914; recovered on Newman Ranch, near Newman (thirty-five miles northeast of El Paso, Texas) about March 1, 1915.

TEXAS. Banded ^{1/} September 23, 1914; recovered twenty-five miles west of Houston, Texas, December 28, 1915.

^{1/} All birds were banded and released near the mouth of Bear River, Utah.

<u>California</u>	Bishop
✓ Vallejo -	✓ Sacramento
Eden	✓ Rutherford
✓ Alvarado	✓ Junction of Cordelia & Suisun Sloughs.
✓ Dos Palos	✓ Gustine, Merced Co.
✓ Calipatria	✓ Dominguez "
	✓ Los Baños
	✓ Mouth of Pajaro River near Watsonville.
	✓ Maricopa, Kern County
	✓ Porterville
	✓ Wasco
	Semitropic
	✓ <u>Orange County</u> between Santa Ana & Summit Beach
<u>New Mexico</u>	Newman.
	Las Vegas

Texas 25 miles west of Houston.

Mainer Lake, Brazoria County

Markham

Ulton, Lamb Co.

O'Donnell, Dawson Co.

Arizona

Miami

Show Low

J. Lawrence ~~Reynolds~~

San Pedro River, N.W. Cochise Co.

Colorado

Sanford, Conejos Co.

Widway

Saskatchewan

Expanse.

Estevan

Montana

Glasgow.

Billings

Nebraska

Hyannis

Oklahoma

Elmer, Jackson Co.

Salt Plains of Alfalfa Co.

Missouri . Asbury .

Kansas . Nashville, Kingman Co.

Mexico - Mexcaltitan, Tepic
Papagayo Lagoon, Guerrero

Utah

Logan

Provo

Delta

Salt Lake City

Mouth of Weber River

Syracuse

Gunnison

Hehi

Mouth of Bear River (+)

Idaho.

Pebble (Bannock Co.)

On Snake River in Fremont Co.

Stone

Hamers

Soda Springs

MIGRATION RECORDS FROM WILD DUCKS AND OTHER BIRDS
BANDED IN THE SALT LAKE VALLEY, UTAH.

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CONTENTS.

Page.	Page.
Introduction.	Cinnamon teal.
Migration and occurrence records. .	Shoveller, or spoonbill.
Mallard	Pintail.
Gadwall	Redhead.
Green-winged teal	Other birds.

INTRODUCTION.

The Bear River marshes at the north end of Great Salt Lake, Utah, a region highly attractive to wild ducks and other waterfowl, are known as one of the great centers where such birds gather in the west, ^{so that} the migratory movements of ^{the} large numbers of birds that visit this region are necessarily of interest and importance. In the period from 1914 to 1916 the writer, while engaged in the study of a sickness among ducks due to an alkali poisoning, prevalent in the Salt Lake marshes, had opportunity to band and release a considerable number of ducks and other birds, a fair proportion of which were killed subsequently in other regions. Reports already published ¹ have

¹ Reports made on the author's investigations of the duck sickness in Utah are contained in bulletins of the U. S. Department of Agriculture as follows: No. 217, Mortality among Waterfowl around Great Salt Lake, Utah (Preliminary Report), 10 p., 3 pls., 1915; and No. 672, The Duck Sickness in Utah, 25 p., 4 pls., 1918. Other reports based in part on investigations then made are contained in Bulletin No. 793, Lead Poisoning in Waterfowl, 12 p., 2 pls., 1919; and No. 936, Wild Ducks and Duck Foods of the Bear River Marshes, Utah, 20 p., 4 pls., 1921.

NOTE. - This bulletin is a report on a study of the migratory movements of waterfowl and other birds, based on banding operations carried on in Utah from 1914 to 1916. It is for the information of sportsmen, ornithologists, and others interested in bird migration and the protection of game birds.

dealt with the so-called duck sickness, and have detailed methods by which a considerable number of the birds affected were cured. Before such individuals were set at liberty a numbered band of aluminum was placed on one leg, and record made of the number, the species of bird, and the date of release. In addition to wild ducks a number of young of other marsh birds were marked in a similar manner before they were able to fly. The release of these banded birds was given publicity, and reports on bands recovered have been received from widely scattered sections in the United States and even from Canada and Mexico. An account of these records is presented in detail in this bulletin.

Bands were placed on 1,241 individuals of 23 species of birds of large or medium size belonging to various families, the majority on wild ducks of 9 species. The bands used were of two kinds, both made of aluminum and manufactured originally for use in marking poultry. In each style a serial number was stamped on one side. The reverse of one was marked, "Notify U. S. Dept. Ag^t. Wash. D. C." and of the other, "Notify Biological Survey, Washington, D. C."

In the case of birds that had been at liberty for more than a year the bands returned were badly worn, and those received after two years wear were thin and friable. One band more than four years old was recovered, but it is probable that on most birds that survived beyond a period of three years bands had become worn until they were broken and lost. To be used successfully, therefore, bands for water birds should be twice as thick as those ordinarily used for poultry. The thicker bands are now being employed by the Biological Survey in its extensive bird banding operations.

All birds banded as a basis for the present study were released near the Duckville Gun Club at the mouth of Bear River, Utah, save for a few that in 1916 were given to the State Fish and Game Commission for exhibition at the annual State fair in Salt Lake City; these were subsequently released near Geneva, Utah, on the shore of Utah Lake. From the 1,241 birds that were banded, 180 returns have been received, or somewhat more than 14 per cent. Of the whole number banded, 994 were ducks, of which 174 were recovered. The number of returns from birds of this group, a little more than 17 per cent, indicates the results that may be obtained from work in banding birds of this family.

In considering these records it should be borne in mind that many of the birds banded at the mouth of Bear River, Utah, were individuals that had not bred there. Drake pintails and a few mallards begin to come into that region after the first week in June and continue to gather, perhaps from points far distant, from then until late in fall. Migration out to other points begins about the first week in September, and there is a constant shifting of the waterfowl population during the fall as birds arrive from the north or leave for other points. The Bear River bays begin to freeze about Thanksgiving time, and in normal years by December 1, ducks are forced out of this region, although an occasional open winter may permit their sojourn until in January or later. A few remain to winter in Utah in sloughs or channels kept open by spring water, but the majority perform extended flights to other regions. Some of the wintering mallards pass a short distance northward into the Snake River drainage in Idaho.

Returns from all the records cover a vast area extending from western Missouri and Kansas west to California, and from southern Mexico (Guerrero) to Saskatchewan (see Fig. 1). A study of the results indicates one general line of flight to the west from the Salt Lake Valley to California, a route followed by green-winged teals and shovellers and part of the mallards and pintails. Another line of flight, taken by a group of birds that includes cinnamon teals, redheads, pintails, and mallards, crosses to the Great Plains region and travels south into Texas. Indications are that some of those last mentioned fly north and east to cross the divide separating Snake River from the headwaters of the Missouri ^{and} follow down east of the foothills of the Rocky Mountains; that all ^{surround} follow such a route is doubtful, since there is nothing to prevent a direct flight ^{to the east or southeast} across any of the mountain passes. There is also a third general migration southward over the Rocky Mountain Plateau, probably by a comparatively small number of birds, that carries the snowy herons and some of the ducks through the scattered lakes and ponds found in Utah, New Mexico, and Arizona. ^{central and southern}

MIGRATION AND OCCURRENCE RECORDS.

In the following list are given species from which there have been no returns, with figures to indicate the number of individuals banded and set at liberty:

	<u>Banded.</u>
Western grebe	4
Pied-billed grebe	4
California gull	1
Ring-billed gull	1
Baldpate, or American widgeon	14
Ruddy duck	2
White-faced glossy ibis	104
American bittern	1
Black-crowned night heron	7
Avocet	6
Black-necked stilt	4
Marbled godwit	1

Species from which returns have been received are as follows, the numbers in the first column following each indicating the number of individuals banded, and in the second, the number recovered and reported upon:

	<u>Banded.</u>	<u>Returned.</u>
Double-crested cormorant	1	1
Mallard	72	22
Gadwall	17	4
Green-winged teal	336	49
Cinnamon teal	45	5
Shoveller, or spoonbill	48	9
Pintail	221	34
Redhead	239	51
Great blue heron	11	4
Snowy heron	83	3
American coot	18	1

FIG. 1.--Map of the western United States, showing migrations of ducks and other wild birds banded in the Salt Lake Valley, Utah, in three years, 1914-16, with return records to 1922. The place of banding and release is indicated by a cross. Localities where banded birds were later recovered are indicated by round dots, a single dot in some cases representing several returns.

Mallard.

In comparison with some of the other species of ducks the number of mallards handled was comparatively small, as only 72 were banded and released during the three seasons in which this work was carried on. Of these, 22 - a little more than 30 per cent - were killed and reported subsequently (see Table 1). Seven were secured near the mouth of Bear River within a few miles of their place of release, 6 of them, and possibly 7, during the fall in which they had been marked. The other 15 individuals divide into two main groups, one in which the birds remained until late fall or winter in the same general region as the mouth of Bear River, and the other in which they made extended migrations to other regions.

In October two birds marked during the preceding month were taken on Bear River near Tremonton not far in an air line from the mouth of the stream. During November these ducks may wander more extensively, as, though several were taken during this month near the mouth of Bear River and one a short distance from Tremonton, others were reported in the sloughs near Great Salt Lake, west of Salt Lake City, and on Utah Lake near Provo. In addition to these late in November one was secured near Logan, Utah, and another on Snake River in Fremont County, Idaho. Records for December are more widely scattered. One bird was killed on Bear River near Collinston, December 13, and another on the Logan River in Cache Valley, December 28. In the same month a drake was shot far to the south on the Sevier River, north of Delta, Utah. During January one was taken near Pebble, Bannock County, Idaho, on the 14th, and another near Stone, in the same State, on the 19th. The latter bird was at freedom from June 17, 1915, to January 19, 1917.

From this account it would seem that a number of mallards remain in ponds and channels kept open by the inflow of spring water after more extensive bodies of water are closed by ice. Such birds pass north in suitable localities as far as the Snake River in Idaho.

Return records from other States are notable more for their wide scattering than for anything else. One banded bird secured near Bishop, in Owens Valley, California (in the Great Basin), on October 16, does not necessarily indicate an early migration from the Salt Lake Valley, for it had been at freedom for two years ^{at that} and, ~~though highly probable,~~ there is no definite certainty that it had come from Utah the year it was killed. A second bird was taken about March 1 in southeastern New Mexico, and a third on December 28, west of Houston, Texas. Part of the mallards from Salt Lake Valley therefore go west into California and part into the drainage basins leading into the western part of the Gulf of Mexico.

TABLE 1.--Record of returns for banded mallards.

Date released. ^{1/}	Date recovered.	Place recovered.	
		State.	Locality.
Sept. 16, 1914	Fall, 1914 ^{2/}	Utah	Mouth of Bear River ^{3/}
" 25, "	" "	"	" " " "
" 17, 1916	Nov. 28, 1916	"	" " " "
" 28, "	" 12, "	"	" " " "
" " "	" " "	"	" " " "
Oct. 23, "	" 15, "	"	" " " "
Sept. 16, 1914	Dec. 28, 1914	"	On Logan River, Cache Valley, near Logan.
" 23, "	Oct. 9, "	"	Two miles east of Tremonton.
" 25, "	Nov. 29, "	"	At Utah Lake, 3 miles southwest of Provo.
" 5, 1915	" 7, 1915	"	Two miles south of Thatcher.
" 14, "	" 26, "	"	Five miles southwest of Logan.
Aug. 27, 1916	Dec. 31, 1916	"	On Sevier River, 7 miles north of Delta.
Sept. 7, "	Oct. 9, "	"	Three miles southwest of Tremonton.
" 28, "	Dec. 13, "	"	On Bear River, near Collinston.
" 29, "	Nov. 10, "	"	West Lakes near Salt Lake City.
" 23, 1914	Jan. 14, 1915	Idaho	Pebble, Bannock County.
" 24, "	Nov. 15, 1914	"	On Snake River, Fremont County.
June 17, 1915	Jan. 19, 1917	"	Near Stone.
Sept. 24, 1914	Oct. 16, 1916	California	Nine miles south of Bishop.
" 25, "	Mar. 1, 1915 ^{4/}	New Mexico	Newman Ranch, near Newman, 35 miles northeast of El Paso, Tex.
" 23, "	Dec. 25, "	Texas	Twenty-five miles west of Houston.

^{1/}

All banded and released at the mouth of Bear River, Utah.

^{2/}

This bird and the one following were killed sometime after November 1 of the year in which marked.

^{3/}

The band of one other mallard killed here late in the fall of 1915 was lost, so that information as to date of banding is not available.

^{4/}

Approximate date.

Gadwall.

Only 17 gadwalls were banded during the course of this work but of these, returns came from 4 individuals (see Table 2). As all were killed in the immediate vicinity of the mouth of Bear River during the same year in which they were set at liberty (except possibly in one instance) they offer nothing in regard to possible lines of migration of the species. Only one of the records is worthy of comment, an individual that was given its freedom August 27, 1916, and was killed below Willard, Utah, about October 12, 1916. Others lived at liberty only a comparatively short time.

TABLE 2.--Record of returns for banded gadwalls.

Date ¹ / _{released.}	Date recovered.	Place recovered.	
		State.	Locality.
Sept. 11, 1915	Oct. 1, 1915	Utah	Mouth of Bear River. ² / _✓
" " "	" 1-8, "	"	" " " "
Aug. 27, 1916	" 12, 1916 ³ / _✓	"	Below Willard.

¹/_✓ All banded and released at the mouth of Bear River, Utah.

²/_✓ The band taken from one gadwall killed in the fall of 1915 was lost before the number was recorded. This bird may have been released during 1915 or may have been one of three marked the previous year.

³/_✓ Approximate date.

Green-winged Teal.

Of the total number of birds banded 336, or slightly more than one fourth, were green-winged teals, ^{of which} 49 of those marked have been reported by hunters (see Table 3). Among 23 of these birds killed near their place of release (near the mouth of Bear River), 21 were taken during the same fall in which they were set free, after periods varying from a few days to more than a month. Two however survived for slightly more than a year, only to be taken in this same region. Seven others were reported from Utah, two from the mouth of the Weber River, and four from the marshes along the Jordan River or the sloughs west of Salt Lake City. One, set at liberty on Utah Lake, was killed in the same vicinity two days later. All seven were taken during the fall in which they were banded.

It would appear that the majority or at least many of the green-winged teals found in fall in the Salt Lake Valley pass in migration to California, as 19 of the return records come from that State. Several were secured in the southern Sacramento Valley and others farther south in the marshes of the San Joaquin River in Merced and Fresno Counties. None were found north of Sacramento, but to the south, records come from as far down as Semitropic and Wasco, in Kern County, in the interior; and from Orange County, south of Los Angeles, on the coast. A coastal record of interest is that from Watsonville, Santa Cruz County, south of San Francisco Bay. Several were secured in the famous ducking grounds in the vicinity of Los Baños. One of these individuals was taken as early as November 17, and all others during the months of December and January.

Elsewhere one bird was recorded from near Miami in south central Arizona in December, and one near Sanford in southern Colorado in March. Two of the ducks under discussion enjoyed their liberty for 24 and 27 months respectively before they were killed. Others were retaken during the winter following their release.

To summarize the data presented, it would appear that the majority of the green-winged teals leave Utah to winter in California, a few are found in Arizona, and in returning north in spring a few pass through Colorado at least along the upper courses of the Rio Grande.

Cinnamon Teal.

Five return records were received from 45 banded individuals of the cinnamon teal, a small number but one that includes notes of considerable interest. One released October 3, 1916 was taken in the same vicinity three days later. Another, banded September 2, 1916 was more fortunate as it was not captured until October 1, 1917, more than a year later when it was shot three miles north of the Duckville Gun Club in same marshes where it had been set at freedom; its travels during that year may be only a source for conjecture. One banded September 1, 1916, was taken November 4, 1916, near the mouth of the Weber River, and another marked September 4, 1916, was secured subsequently at the Rudy Duck Club in the marshes at the mouth of the Jordan River on October 8, 1916. The fifth record is that of a bird released September 16, 1914, and recovered January 20, 1915, at Mainer Lake, Brazoria County, Texas, a short distance west of Galveston.

Though the slender evidence available indicates a migration of this species from northern Utah to the Gulf coast of Texas, it is probable that with further data some birds marked in the same region will be recovered in California. Normally the majority of the cinnamon teals leave the region around Great Salt Lake before the first of October so that only straggling individuals are found later, after the opening of the shooting season.

TABLE 4.--Record of returns for banded cinnamon teal.

Date ¹ released.	Date recovered.	Place recovered.	
		State.	Locality.
Oct. 3, 1916	Oct. 6, 1916	Utah	Mouth of Bear River.
Sept. 1, 1916	Nov. 4, 1916	"	Near mouth of Weber River.
Sept. 2, 1916	Oct. 1, 1917	"	Bear River marshes, 3 miles north of Duckville Gun Club.
Sept. 4, 1916	Oct. 8, 1916	"	Marshes at mouth of Jordan River.
Sept. 16, 1914	Jan. 20, 1915	Texas	Mainer Lake, Brazoria County, west of Galveston.

¹ All banded and released at the mouth of Bear River, Utah.

Shoveller, or Spoonbill.

The percentage of returns on banded shovellers, or spoonbills, was slightly higher than in the case of the cinnamon teal as from a total of 48 birds released 9 were subsequently reported (see Table 5). Six of these were killed in the Bear River marshes (several in South Bay, one on the Salt Creek marshes, and one on the Chesapeake Bay) from a few days to several weeks after they had been banded. One was captured at the mouth of the Weber River, and another at the mouth of the Jordan near Salt Lake City. The remaining bird was taken near Vallejo, Calif., nearly fourteen months after it had been released. From this slight evidence it appears that some spoonbills migrate from Utah to pass the winter in California.

TABLE 5.--Record of returns for banded shovellers.

Date ¹ released.	Date recovered.	Place recovered.	
		State.	Locality.
Sept. 29, 1914	Oct. 17, 1914	Utah	Mouth of Bear River.
" 1, 1916	" 12, 1916	"	" " " "
" 25, "	" 7, "	"	" " " "
" 28, "	" 1, "	"	" " " "
" " "	" 8, "	"	" " " "
" " "	" 7, "	"	" " " "
" " "	" 21, "	"	Mouth of Weber River.
" 29, "	" 20, " ²	"	Mouth of Jordan River.
" 1, "	" 28, 1917	California	Near Vallejo.

¹ All banded and released at the mouth of Bear River, Utah.

² Approximate date.

Pintail.

While only 34 bands have been returned from a total of 221 pintails released the distribution shown is the most remarkable of any of the birds included in the present account (see Table 5). Only seven banded pintails were killed near the mouth of Bear River, five during October of the fall in which released, one probably secured in November, and one in April of the following spring. Other records for Utah come from Bear River a few miles above its mouth, the mouth of the Weber River, the Jordan River, and the marshes west of Salt Lake City, four during October and three during November of the fall of their release. Another killed near the mouth of the Jordan River was at freedom from September 29, 1916, until late in November, 1920.

Many pintails ^{apparently} ~~seem to~~ ⁱⁿ migrate to winter to the interior valleys of California, as shown by eight returns from the area between the marshes above Suisun Bay and the Imperial Valley south of Calipatria. As might be expected several of these birds were shot in the extensive marshes of the San Joaquin River in Merced and Fresno Counties. One bird released August 20 was killed October 16, near Dos Palos, Merced County, indicating an early migration, while two others were secured in November. Two were noted in December and three in January, months when in normal years pintails should all be absent from Utah.

Proper interpretation and presentation of data from States farther east is more difficult. The evidence indicates a line of flight to the northward to the drainage of the Missouri River, as one of the marked birds was secured near Glasgow, Montana, on September 15, eleven days after its release. Another fall record from farther south is that of a bird from near Hyannis in the sandhill region of Nebraska. A report from near Markham, on the Gulf coast of Texas, would seem to represent a bird in its winter home. In the region from the Mississippi River westward to the Great Plains numbers of pintails linger through the winter south of the line of ice and with the coming of open water in the earliest of spring thaws crowd eagerly northward during favorable weather, perhaps to be driven southward again in a few days by a sudden freeze that closes the streams and ponds. Their numbers are increased late in January by birds coming from winter homes farther south. Reports from Oklahoma and eastern New Mexico at the end of January, and from the panhandle of Texas near the end of February, are supposed to represent such restless early migrants.

One of these, a bird captured on the salt plains of the Salt Fork of the Arkansas River in Oklahoma, had a history of unusual interest. In September, 1914, a pintail helpless with the duck sickness was noted on the flats of South Bay, as the writer was crossing in a mud-boat - a flat-bottomed launch ^{driven by an} ~~with an~~ automobile engine as motive power to ~~drive~~ ^{with} steel-bladed paddle wheels on either ^{side} side, designed to run over smooth clay mud barely covered with water. A motion to the steersman was sufficient to change the course slightly, so that dashing past in a spray of mud and water, a veritable charging juggernaut, it was possible to lean out, seize the duck, and draw it in. A peculiar crescent of white feathers marked this individual duck from others so that it was easily recognized. On September 23 after a week or two in captivity the bird, now fairly tame, was banded and released. For a month it lingered about the duck pens, returning ^{until the laboratory was closed in late October for the season} night and morning to be fed, though the shooting season was on. About February 1, 1915, this bird was captured alive in Oklahoma and on March 6 of the same year was still alive and in captivity.

The most eastern report of any of the banded ducks was that of a pintail shot on January 26 near Asbury, in western Missouri, presumably another migrant in northward flight. Two records for southern Saskatchewan, one in April and the other of uncertain date mark the northern limit from which birds have been reported.

From these data we learn that after leaving Utah part of the pintails go to California to winter in the interior valleys, while others cross to the Great Plains and go southward to the Gulf coast in Texas. The spring migration carries the latter individuals northward through the Plains again, eastward as far as western Missouri, and north at least into southern Canada. Spring records in the Missouri Valley drainage ceased after 1915, as in the following year spring shooting in the United States was prohibited by Federal law, and no further return came from ducks killed at this season.

It may be noted that only a small part of the pintails found in early fall in the Salt Lake Valley nest there, as the species is only moderately common as a breeder in that region. Migrants from other regions, probably to the northward, arrive early, even in June, and continue to gather in suitable areas until fall.

¹ See U. S. Dept. Agr. Bull. No. 936, pp. 7-8.

Banding records furnish some idea as to the average length of life of a pintail after it reaches maturity. Of birds banded in September, 1914, one was taken in April and one in November, 1916, one in January, 1917, and one in December, 1917. Of those marked from August to October, 1916, one was shot in December, 1917, two in January and one in November, 1918, while one was fortunate enough to escape until the last of November, 1920, a period of slightly more than four years.

Redhead.

Domestic ties in the redhead family are as loose perhaps as among any of the North American ducks. Several females may use one nest for their eggs, and when ducklings appear they are self-reliant little chaps that as often as not start off on adventurous explorations of their own with no regard for the movements of their mother. The parent may forsake her charges when they are less than half grown, and it is the rule for them to be left to their own devices at an early age. Though like certain other children in their lack of respect for parental guidance and opinion, young redheads are gregarious and seek others of the season's hatching so that they ordinarily travel in company. These inexperienced birds as they passed the duck pens where birds convalescent from the duck sickness were confined came over in search of company, and clambered out on shore in an attempt to join the ducks in the cages. Trapping them when still unable to fly was an easy matter, so that in 1915 and 1916 many were captured, and 239 were banded and released. Fifty-one of these have been reported by hunters (see Table 6). More than half, 28 to be exact, were taken in the Bear River marshes, all during the fall of their release.

The birds were marked in August and September. Two of the returns came during the month of September, one from a bird found dead from the duck sickness, and one from an individual drowned accidentally at the duck pens. Twenty-two were killed during October, a number potted by hunters as they passed in boats up or down the river, others shot at points on the bays in the delta of the stream or near the river below Corinne. Two were secured on November 5 and two on November 12.

Among sixteen other records for Utah six came from the vicinity of Bear River above its mouth, or its larger tributaries within a radius of 50 miles. Five of these returns were secured between October 1 and 17 of the year of their release. A single individual shot November 22 near Honeyville was reported as thin and poor so that it perhaps was diseased or injured in some way. One was killed near the Hot Springs north of Ogden on November 18, and one near the mouth of the Weber River on October 29. From a little farther south three were reported from Syracuse near the border of Great Salt Lake, two birds shot in company on October 14, and one on October 20. Two were shot on October 2 in the sloughs west of Salt Lake City and another in the same vicinity about the middle of November. In the Narrows of the Jordan River, 20 miles south of Salt Lake City one was killed December 24, 1915, while another was recorded from the Sevier River near Gunnison, Utah, October 1.

Three marked redheads were secured in eastern Idaho, all in or near the drainage of Snake River. Two of these were shot on October 1 and 15 respectively, and one, taken in Bingham County, on December 8, more than two years after it was released.

Scattered records from east of the Rocky Mountains have considerable value as they indicate a line of flight to a winter range. One bird released September 27, 1916, was killed about November 27 near Ordway, in the drainage of the Arkansas River on the plains of eastern Colorado. Another banded October 23, 1916, was secured near O'Donnell, Dawson County, western Texas, on November 22. A third set at freedom August 20, 1916, was secured ^{Killed} near Nashville, Kingman County, south central Kansas, April 21, 1917, probably while in northward migration. The last of these distant records, one without apparent connection with the others, is that of an individual released between August 27 and September 27, 1916, and killed January 25, 1919, on the Florence Reservoir, near Florence, Ariz., in the Gila River Basin.

The majority of redheads on the Bear River marshes leave in fall migration between the 1st and the 10th of September, and after that only stragglers are found. Indications from returns of banded birds are that the line of flight is to the eastward, probably to a wintering ground on the Gulf coast of Texas, though nonreturns have actually come from that region. It is possible that part of these birds travel northward to the drainage area of the Missouri and then swing southward over the plains, since two records come from eastern Idaho at the proper season to support such belief. Release of young birds late in September, after the bulk of the species has left, may induce more or less aimless wandering among some and account for part of the scattered returns. However, there is a distinct movement southward along the eastern shore of Great Salt Lake for a distance of 60 miles that may be an indication of a second line of southward flight. December records for Utah and Idaho are perhaps from injured individuals unable to perform extended flights.

Returns from other birds.

Records of four species of other families of birds may be considered briefly.

An immature double-crested cormorant that was banded on July 3, 1915, was shot near the Jordan River, 12 miles northwest of Salt Lake City on October 10 of the same year.

Of eleven great blue herons marked in 1916 while in the nest, a return came from one bird, an individual banded July 3, 1916, and killed November 1, 1916, 4 miles southwest of Billings, Mont. The indicated northward movement after the breeding season is in accordance with similar habits recorded for little blue herons and egrets in the east.

Among eighteen American coots, one marked on August 20, 1916, was shot on December 5 about 75 miles south, near Lehi, Utah. As this species is not hunted extensively in the West nothing was heard from others.

The snowy heron nests in colonies in the lower Bear River marshes, and on July 3 and 14, 1916, 83 nestlings were marked with bands. In March, 1917, a peon at Mexcaltitan, Territory of Tepic, Mexico, brought a bit of aluminum to a Japanese labor contractor who chanced to pass through, saying that he had found it on the leg of a heron that he had killed and eaten. The band had been preserved out of curiosity as the peon was unable to read, but chance brought a return on one of the snowy herons marked in Utah the previous year. About June 1, 1917, another was killed on the Papagayo Lagoon, in Guerrero, Mexico (long. $99^{\circ} 48'$ W., lat. $16^{\circ} 48'$ N.) and was reported through the State Department by the American consul at Acapulco. A third record is of a snowy heron found on the San Pedro River in northwestern Cochise County, Arizona, on April 13, 1919 (released in Utah, July 3, 1916). From this it seems that the breeding snowy herons of the Salt Lake Valley winter on the west coast of Mexico. Their route northward may follow the Colorado River, or birds may scatter in an inland flight that carries them more or less directly northward. In Utah it was observed that though part of the snowy herons arrived early, others continued to join the breeding colonies until late in June, observations that coincide with the late date at which one from this region was secured in Guerrero.

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CONTENTS.

Page.	Page.
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¹ Reports made on the author's investigations of the duck sickness in Utah are contained in bulletins of the U. S. Department of Agriculture as follows: No. 217, Mortality among Waterfowl around Great Salt Lake, Utah (Preliminary Report), 10 p., 3 pls., 1915; and No. 672, The Duck Sickness in Utah, 25 p., 4 pls., 1918. Other reports based in part on investigations then made are contained in Bulletin No. 793, Lead Poisoning in Waterfowl, 12 p., 2 pls., 1919; and No. 986, Wild Ducks and Duck Foods of the Bear River Marshes, Utah, 20 p., 4 pls., 1921.

NOTE. - This bulletin is a report on a study of the migratory movements of waterfowl and other birds, based on banding operations carried on in Utah from 1914 to 1916. It is for the information of sportsmen, ornithologists, and others interested in bird migration and the protection of game birds.

dealt with the so-called duck sickness, and have detailed methods by which a considerable number of the birds affected were cured. Before such individuals were set at liberty a numbered band of aluminum was placed on one leg, and record made of the number, the species of bird, and the date of release. In addition to wild ducks a number of young of other marsh birds were marked in a similar manner before they were able to fly. The release of these banded birds was given publicity, and reports on bands recovered have been received from widely scattered sections in the United States and even from Canada and Mexico. An account of these records is presented in detail in this bulletin.

Bands were placed on 1,241 individuals of 23 species of birds of large or medium size belonging to various families, the majority on wild ducks of 9 species. The bands used were of two kinds, both made of aluminum and manufactured originally for use in marking poultry. In each style a serial number was stamped on one side. The reverse of one was marked, "Notify U. S. Dept. Agr. Wash. D. C." and of the other, "Notify Biological Survey, Washington, D. C."

In the case of birds that had been at liberty for more than a year the bands returned were badly worn, and those received after two years wear were thin and friable. One band more than four years old was recovered, but it is probable that on most birds that survived beyond a period of three years bands had become worn until they were broken and lost. To be used successfully, therefore, bands for water birds should be twice as thick as those ordinarily used for poultry. The thicker bands are now being employed by the Biological Survey in its extensive bird banding operations.

All birds banded as a basis for the present study were released near the Duckville Gun Club at the mouth of Bear River, Utah, save for a few that in 1916 were given to the State Fish and Game Commission for exhibition at the annual State fair in Salt Lake City; these were subsequently released near Geneva, Utah, on the shore of Utah Lake. From the 1,241 birds that were banded, 180 returns have been received, or somewhat more than 14 per cent. Of the whole number banded, 994 were ducks, of which 174 were recovered. The number of returns from birds of this group, a little more than 17 per cent, indicates the results that may be obtained from work in banding birds of this family.

In considering these records it should be borne in mind that many of the birds banded at the mouth of Bear River, Utah, were individuals that had not bred there. Drake pintails and a few mallards begin to come into that region after the first week in June and continue to gather, perhaps from points far distant, from then until late in fall. Migration out to other points begins about the first week in September, and there is a constant shifting of the waterfowl population during the fall as birds arrive from the north or leave for other points. The Bear River bays begin to freeze about Thanksgiving time, and in normal years by December 1, ducks are forced out of this region, although an occasional open winter may permit their sojourn until in January or later. A few remain to winter in Utah in sloughs or channels kept open by spring water, but the majority perform extended flights to other regions. Some of the wintering mallards pass a short distance northward into the Snake River drainage in Idaho.

Returns from all the records cover a vast area extending from western Missouri and Kansas west to California, and from southern Mexico (Guerrero) to Saskatchewan (see Fig. 1). A study of the results indicates one general line of flight to the west from the Salt Lake Valley to California, a route followed by green-winged teals and shovellers and part of the mallards and pintails. Another line of flight, taken by a group of birds that includes cinnamon teals, redheads, pintails, and mallards, crosses to the Great Plains region and travels south into Texas. Indications are that some of these last mentioned fly north and east to cross the divide separating Snake River from the headwaters of the Missouri to follow down east of the foothills of the Rocky Mountains; that all follow such a route is doubtful, since there is nothing to prevent a direct flight across any of the mountain passes. There is also a third general migration southward over the Rocky Mountain Plateau, probably by a comparatively small number of birds, that carries the snowy herons and some of the ducks through the scattered lakes and ponds found in Utah, New Mexico, and Arizona.

MIGRATION AND OCCURRENCE RECORDS.

In the following list are given species from which there have been no returns, with figures to indicate the number of individuals banded and set at liberty:

	<u>Banded.</u>
Western grebe	4
Pied-billed grebe	4
California gull	1
Ring-billed gull	1
Baldpate, or American widgeon	14
Ruddy duck	2
White-faced glossy ibis	104
American bittern	1
Black-crowned night heron	7
Avocet	6
Black-necked stilt	4
Marbled godwit	1

Species from which returns have been received are as follows, the numbers in the first column following each indicating the number of individuals banded, and in the second, the number recovered and reported upon:

	<u>Banded.</u>	<u>Returned.</u>
Double-crested cormorant	1	1
Mallard	72	22
Gadwall	17	4
Green-winged teal	336	49
Cinnamon teal	45	5
Shoveller, or spoonbill	48	9
Pintail	221	34
Redhead	239	51
Great blue heron	11	4
Snowy heron	83	3
American coot	18	1

FIG. 1.--Map of the western United States, showing migrations of ducks and other wild birds banded in the Salt Lake Valley, Utah, in three years, 1914-16, with return records to 1922. The place of banding and release is indicated by a cross. Localities where banded birds were later recovered are indicated by round dots, a single dot in some cases representing several returns.

Mallard.

In comparison with some of the other species of ducks the number of mallards handled was comparatively small, as only 72 were banded and released during the three seasons in which this work was carried on. Of these, 22 - a little more than 30 per cent - were killed and reported subsequently (see Table 1). Seven were secured near the mouth of Bear River within a few miles of their place of release, 6 of them, and possibly 7, during the fall in which they had been marked. The other 15 individuals divide into two main groups, one in which the birds remained until late fall or winter in the same general region as the mouth of Bear River, and the other in which they made extended migrations to other regions.

In October two birds marked during the preceding month were taken on Bear River near Tremonton not far in an air line from the mouth of the stream. During November these ducks may wander more extensively, as, though several were taken during this month near the mouth of Bear River and one a short distance from Tremonton, others were reported in the sloughs near Great Salt Lake, west of Salt Lake City, and on Utah Lake near Provo. In addition to these late in November one was secured near Logan, Utah, and another on Snake River in Fremont County, Idaho. Records for December are more widely scattered. One bird was killed on Bear River near Collinston, December 13, and another on the Logan River in Cache Valley, December 28. In the same month a drake was shot far to the south on the Sevier River, north of Delta, Utah. During January one was taken near Pebble, Bannock County, Idaho, on the 14th, and another near Stone, in the same State, on the 19th. The latter bird was at freedom from June 17, 1915, to January 19, 1917.

From this account it would seem that a number of mallards remain in ponds and channels kept open by the inflow of spring water after more extensive bodies of water are closed by ice. Such birds pass north in suitable localities as far as the Snake River in Idaho.

Return records from other States are notable more for their wide scattering than for anything else. One banded bird secured near Bishop, in Owens Valley, California (in the Great Basin), on October 16, does not necessarily indicate an early migration from the Salt Lake Valley, for it had been at freedom for two years and, though highly probable, there is no definite certainty that it had come from Utah the year it was killed. A second bird was taken about March 1 in southeastern New Mexico, and a third on December 28, west of Houston, Texas. Part of the mallards from Salt Lake Valley therefore go west into California and part into the drainage basins leading into the western part of the Gulf of Mexico.

TABLE 1.--Record of returns for banded mallards.

Date ¹ released.	Date recovered.	Place recovered.	
		State.	Locality.
Sept. 16, 1914	Fall, 1914 ²	Utah	Mouth of Bear River ³
" 25, "	" "	"	" " " "
" 17, 1916	Nov. 28, 1916	"	" " " "
" 28, "	" 12, "	"	" " " "
" " "	" " "	"	" " " "
Oct. 23, "	" 15, "	"	" " " "
Sept. 16, 1914	Dec. 28, 1914	"	On Logan River, Cache Valley, near Logan.
" 23, "	Oct. 9, "	"	Two miles east of Tremonton.
" 25, "	Nov. 29, "	"	At Utah Lake, 3 miles southwest of Provo.
" 5, 1915	" 7, 1915	"	Two miles south of Thatcher.
" 14, "	" 26, "	"	Five miles southwest of Logan.
Aug. 27, 1916	Dec. 31, 1916	"	On Sevier River, 7 miles north of Delta.
Sept. 7, "	Oct. 9, "	"	Three miles southwest of Tremonton.
" 28, "	Dec. 13, "	"	On Bear River, near Collinston.
" 29, "	Nov. 10, "	"	West Lakes near Salt Lake City.
" 23, 1914	Jan. 14, 1915	Idaho	Pebble, Bannock County.
" 24, "	Nov. 15, 1914	"	On Snake River, Fremont County.
June 17, 1915	Jan. 19, 1917	"	Near Stone.
Sept. 24, 1914	Oct. 16, 1916	California	Nine miles south of Bishop.
" 25, "	Mar. 1, 1915 ⁴	New Mexico	Newman Ranch, near Newman, 35 miles northeast of El Paso, Tex.
" 23, "	Dec. 28, "	Texas	Twenty-five miles west of Houston.

¹ All banded and released at the mouth of Bear River, Utah.

² This bird and the one following were killed sometime after November 1 of the year in which marked.

³ The band of one other mallard killed here late in the fall of 1915 was lost, so that information as to date of banding is not available.

⁴ Approximate date.

Gadwall.

Only 17 gadwalls were banded during the course of this work but of these, returns came from 4 individuals (see Table 2). As all were killed in the immediate vicinity of the mouth of Bear River during the same year in which they were set at liberty (except possibly in one instance) they offer nothing in regard to possible lines of migration of the species. Only one of the records is worthy of comment, an individual that was given its freedom August 27, 1916, and was killed below Willard, Utah, about October 12, 1916. Others lived at liberty only a comparatively short time.

TABLE 2.--Record of returns for banded gadwalls.

Date ¹ released.	Date recovered.	Place recovered.	
		State.	Locality.
Sept. 11, 1915	Oct. 1, 1915	Utah	Mouth of Bear River. ²
" " "	" 1-8, "	"	" " " "
Aug. 27, 1916	" 12, 1916 ³	"	Below Willard.

¹ All banded and released at the mouth of Bear River, Utah.

² The band taken from one gadwall killed in the fall of 1915 was lost before the number was recorded. This bird may have been released during 1915 or may have been one of three marked the previous year.

³ Approximate date.

Green-winged Teal.

Of the total number of birds banded 336, or slightly more than one fourth, were green-winged teals, 49 of those marked have been reported by hunters (see Table 3). Among 23 of these birds killed near their place of release (near the mouth of Bear River), 21 were taken during the same fall in which they were set free, after periods varying from a few days to more than a month. Two however survived for slightly more than a year, only to be taken in this same region. Seven others were reported from Utah, two from the mouth of the Weber River, and four from the marshes along the Jordan River or the sloughs west of Salt Lake City. One, set at liberty on Utah Lake, was killed in the same vicinity two days later. All seven were taken during the fall in which they were banded.

It would appear that the majority or at least many of the green-winged teals found in fall in the Salt Lake Valley pass in migration to California, as 19 of the return records come from that State. Several were secured in the southern Sacramento Valley and others farther south in the marshes of the San Joaquin River in Merced and Fresno Counties. None were found north of Sacramento, but to the south, records come from as far down as Semitropic and Wasco, in Kern County, in the interior; and from Orange County, south of Los Angeles, on the coast. A coastal record of interest is that from Watsonville, Santa Cruz County, south of San Francisco Bay. Several were secured in the famous ducking grounds in the vicinity of Los Banos. One of these individuals was taken as early as November 17, and all others during the months of December and January.

Elsewhere one bird was recorded from near Miami in south central Arizona in December, and one near Sanford in southern Colorado in March. Two of the ducks under discussion enjoyed their liberty for 24 and 27 months respectively before they were killed. Others were retaken during the winter following their release.

To summarize the data presented, it would appear that the majority of the green-winged teals leave Utah to winter in California, a few are found in Arizona, and in returning north in spring a few pass through Colorado at least along the upper courses of the Rio Grande.

Cinnamon Teal.

Five return records were received from 45 banded individuals of the cinnamon teal, a small number but one that includes notes of considerable interest. One released October 3, 1916 was taken in the same vicinity three days later. Another, banded September 2, 1916 was more fortunate as it was not captured until October 1, 1917, more than a year later when it was shot three miles north of the Duckville Gun Club in same marshes where it had been set at freedom; its travels during that year may be only a source for conjecture. One banded September 1, 1916, was taken November 4, 1916, near the mouth of the Weber River, and another marked September 4, 1916, was secured subsequently at the Ruddy Duck Club in the marshes at the mouth of the Jordan River on October 8, 1916. The fifth record is that of a bird released September 16, 1914, and recovered January 20, 1915, at Mainer Lake, Brazoria County, Texas, a short distance west of Galveston.

Though the slender evidence available indicates a migration of this species from northern Utah to the Gulf coast of Texas, it is probable that with further data some birds marked in the same region will be recovered in California. Normally the majority of the cinnamon teals leave the region around Great Salt Lake before the first of October so that only straggling individuals are found later, after the opening of the shooting season.

TABLE 4.--Record of returns for banded cinnamon teal.

Date ¹ released.	Date recovered.	Place recovered.	
		State.	Locality.
Oct. 3, 1916	Oct. 6, 1916	Utah	Mouth of Bear River.
Sept. 1, 1916	Nov. 4, 1916	"	Near mouth of Weber River.
Sept. 2, 1916	Oct. 1, 1917	"	Bear River marshes, 3 miles north of Duckville Gun Club.
Sept. 4, 1916	Oct. 8, 1916	"	Marshes at mouth of Jordan River.
Sept. 16, 1914	Jan. 20, 1915	Texas	Mainer Lake, Brazoria County, west of Galveston.

¹

All banded and released at the mouth of Bear River, Utah.

Shoveller, or Spoonbill.

The percentage of returns on banded shovellers, or spoonbills, was slightly higher than in the case of the cinnamon teal as from a total of 48 birds released 9 were subsequently reported (see Table 3). Six of these were killed in the Bear River marshes (several in South Bay, one on the Salt Creek marshes, and one on the Chesapeake Bay) from a few days to several weeks after they had been banded. One was captured at the mouth of the Weber River, and another at the mouth of the Jordan near Salt Lake City. The remaining bird was taken near Vallejo, Calif., nearly fourteen months after it had been released. From this slight evidence it appears that some spoonbills migrate from Utah to pass the winter in California.

TABLE 5.—Record of returns for banded shovellers.

Date ¹ released.	Date recovered.	Place recovered.	
		State.	Locality.
Sept. 29, 1914	Oct. 17, 1914	Utah	Mouth of Bear River.
" 1, 1916	" 12, 1916	"	" " " "
" 25, "	" 7, "	"	" " " "
" 28, "	" 1, "	"	" " " "
" " "	" 8, "	"	" " " "
" " "	" 7, "	"	" " " "
" " "	" 21, "	"	Mouth of Weber River.
" 29, "	" 20, " ²	"	Mouth of Jordan River.
" 1, "	" 28, 1917	California	Near Vallejo.

¹ All banded and released at the mouth of Bear River, Utah.

² Approximate date.

Pintail.

While only 34 bands have been returned from a total of 221 pintails released the distribution shown is the most remarkable of any of the birds included in the present account (see Table 5). Only seven banded pintails were killed near the mouth of Bear River, five during October of the fall in which released, one probably secured in November, and one in April of the following spring. Other records for Utah come from Bear River a few miles above its mouth, the mouth of the Weber River, the Jordan River, and the marshes west of Salt Lake City, four during October and three during November of the fall of their release. Another killed near the mouth of the Jordan River was at freedom from September 29, 1916, until late in November, 1920.

Many pintails seem to migrate to winter to the interior valleys of California, as shown by eight returns from the area between the marshes above Suisun Bay and the Imperial Valley south of Calipatria. As might be expected several of these birds were shot in the extensive marshes of the San Joaquin River in Merced and Fresno Counties. One bird released August 20 was killed October 16, near Dos Palos, Merced County, indicating an early migration, while two others were secured in November. Two were noted in December and three in January, months when in normal years pintails should all be absent from Utah.

Proper interpretation and presentation of data from States farther east is more difficult. The evidence indicates a line of flight to the northward to the drainage of the Missouri River, as one of the marked birds was secured near Glasgow, Montana, on September 15, eleven days after its release. Another fall record from farther south is that of a bird from near Hyannis in the sandhill region of Nebraska. A report from near Markham, on the Gulf coast of Texas, would seem to represent a bird in its winter home. In the region from the Mississippi River westward to the Great Plains numbers of pintails linger through the winter south of the line of ice and with the coming of open water in the earliest of spring thaws crowd eagerly northward during favorable weather, perhaps to be driven southward again in a few days by a sudden freeze that closes the streams and ponds. Their numbers are increased late in January by birds coming from winter homes farther south. Reports from Oklahoma and eastern New Mexico at the end of January, and from the panhandle of Texas near the end of February, are supposed to represent such restless early migrants.

One of these, a bird captured on the salt plains of the Salt Fork of the Arkansas River in Oklahoma, had a history of unusual interest. In September, 1914, a pintail helpless with the duck sickness was noted on the flats of South Bay, as the writer was crossing in a mud-boat - a flat-bottomed launch with an automobile engine as motive power to drive steel-bladed paddle wheels on either side, designed to run over smooth clay and barely covered with water. A motion to the steersman was sufficient to change the course slightly, so that dashing past in a spray of mud and water, a veritable charging juggernaut, it was possible to lean out, seize the duck, and draw it in. A peculiar crescent of white feathers marked this individual duck from others so that it was easily recognized. On September 23 after a week or two in captivity the bird, now fairly tame, was banded and released. For a month it lingered about the duck pens, returning night and morning to be fed, though the shooting season was on. About February 1, 1915, this bird was captured alive in Oklahoma and on March 6 of the same year was still alive and in captivity.

The most eastern report of any of the banded ducks was that of a pintail shot on January 26 near Asbury, in western Missouri, presumably another migrant in northward flight. Two records for southern Saskatchewan, one in April and the other of uncertain date mark the northern limit from which birds have been reported.

From these data we learn that after leaving Utah part of the pintails go to California to winter in the interior valleys, while others cross to the Great Plains and go southward to the Gulf coast in Texas. The spring migration carries the latter individuals northward through the Plains again, eastward as far as western Missouri, and north at least into southern Canada. Spring records in the Missouri Valley drainage ceased after 1915, as in the following year spring shooting in the United States was prohibited by Federal law, and no further return came from ducks killed at this season.

It may be noted that only a small part of the pintails found in early fall in the Salt Lake Valley nest there, as the species is only moderately common as a breeder in that region. Migrants from other regions, probably to the northward, arrive early, even in June, and continue to gather in suitable areas until fall.

¹ See U. S. Dept. Agr. Bull. No. 936, pp. 7-8.

Banding records furnish some idea as to the average length of life of a pintail after it reaches maturity. Of birds banded in September, 1914, one was taken in April and one in November, 1916, one in January, 1917, and one in December, 1917. Of those marked from August to October, 1916, one was shot in December, 1917, two in January and one in November, 1918, while one was fortunate enough to escape until the last of November, 1920, a period of slightly more than four years.

Redhead.

Domestic ties in the redhead family are as loose perhaps as among any of the North American ducks. Several females may use one nest for their eggs, and when ducklings appear they are self-reliant little chaps that as often as not start off on adventurous explorations of their own with no regard for the movements of their mother. The parent may forsake her charges when they are less than half grown, and it is the rule for them to be left to their own devices at an early age. Though like certain other children in their lack of respect for parental guidance and opinion, young redheads are gregarious and seek others of the season's hatching so that they ordinarily travel in company. These inexperienced birds as they passed the duck pens where birds convalescent from the duck sickness were confined came over in search of company, and clambered out on shore in an attempt to join the ducks in the cages. Trapping them when still unable to fly was an easy matter, so that in 1915 and 1916 many were captured, and 239 were banded and released. Fifty-one of these have been reported by hunters (see Table 6). More than half, 28 to be exact, were taken in the Bear River marshes, all during the fall of their release.

The birds were marked in August and September. Two of the returns came during the month of September, one from a bird found dead from the duck sickness, and one from an individual drowned accidentally at the duck pens. Twenty-two were killed during October, a number potted by hunters as they passed in boats up or down the river, others shot at points on the bays in the delta of the stream or near the river below Corinne. Two were secured on November 5 and two on November 12.

Among sixteen other records for Utah six came from the vicinity of Bear River above its mouth, or its larger tributaries within a radius of 50 miles. Five of these returns were secured between October 1 and 17 of the year of their release. A single individual shot November 22 near Honeyville was reported as thin and poor so that it perhaps was diseased or injured in some way. One was killed near the Hot Springs north of Ogden on November 18, and one near the mouth of the Weber River on October 29. From a little farther south three were reported from Syracuse near the border of Great Salt Lake, two birds shot in company on October 14, and one on October 20. Two were shot on October 2 in the sloughs west of Salt Lake City and another in the same vicinity about the middle of November. In the Narrows of the Jordan River, 20 miles south of Salt Lake City one was killed December 24, 1915, while another was recorded from the Sevier River near Gunnison, Utah, October 1.

Three marked redheads were secured in eastern Idaho, all in or near the drainage of Snake River. Two of these were shot on October 1 and 15 respectively, and one, taken in Bingham County, on December 8, more than two years after it was released.

Scattered records from east of the Rocky Mountains have considerable value as they indicate a line of flight to a winter range. One bird released September 27, 1916, was killed about November 27 near Ordway, in the drainage of the Arkansas River on the plains of eastern Colorado. Another banded October 23, 1916, was secured near O'Donnell, Dawson County, western Texas, on November 22. A third set at freedom August 20, 1916, was secured near Nashville, Kingman County, south central Kansas, April 21, 1917, probably while in northward migration. The last of these distant records, one without apparent connection with the others, is that of an individual released between August 27 and September 27, 1916, and killed January 25, 1919, on the Florence Reservoir, near Florence, Ariz., in the Gila River Basin.

The majority of redheads on the Bear River marshes leave in fall migration between the 1st and the 10th of September, and after that only stragglers are found. Indications from returns of banded birds are that the line of flight is to the eastward, probably to a wintering ground on the Gulf coast of Texas, though no returns have actually come from that region. It is possible that part of these birds travel northward to the drainage area of the Missouri and then swing southward over the plains, since two records come from eastern Idaho at the proper season to support such belief. Release of young birds late in September, after the bulk of the species has left, may induce more or less aimless wandering among some and account for part of the scattered returns. However, there is a distinct movement southward along the eastern shore of Great Salt Lake for a distance of 60 miles that may be an indication of a second line of southward flight. December records for Utah and Idaho are perhaps from injured individuals unable to perform extended flights.

Returns from other birds.

Records of four species of other families of birds may be considered briefly.

An immature double-crested cormorant that was banded on July 3, 1915, was shot near the Jordan River, 12 miles northwest of Salt Lake City on October 10 of the same year.

Of eleven great blue herons marked in 1916 while in the nest, a return came from one bird, an individual banded July 3, 1916, and killed November 1, 1916, 4 miles southwest of Billings, Mont. The indicated northward movement after the breeding season is in accordance with similar habits recorded for little blue herons and egrets in the east.

Among eighteen American coots, one marked on August 20, 1916, was shot on December 5 about 75 miles south, near Lehi, Utah. As this species is not hunted extensively in the West nothing was heard from others.

The snowy heron nests in colonies in the lower Bear River marshes, and on July 3 and 14, 1916, 83 nestlings were marked with bands. In March, 1917, a peon at Mexcaltitlan, Territory of Tepic, Mexico, brought a bit of aluminum to a Japanese labor contractor who chanced to pass through, saying that he had found it on the leg of a heron that he had killed and eaten. The band had been preserved out of curiosity as the peon was unable to read, but chance brought a return on one of the snowy herons marked in Utah the previous year. About June 1, 1917, another was killed on the Papagayo Lagoon, in Guerrero, Mexico (long. $99^{\circ} 48'$ W., lat. $16^{\circ} 48'$ N.) and was reported through the State Department by the American consul at Acapulco. A third record is of a snowy heron found on the San Pedro River in northwestern Cochise County, Arizona, on April 13, 1919 (released in Utah, July 3, 1916). From this it seems that the breeding snowy herons of the Salt Lake Valley winter on the west coast of Mexico. Their route northward may follow the Colorado River, or birds may scatter in an inland flight that carries them more or less directly northward. In Utah it was observed that though part of the snowy herons arrived early, others continued to join the breeding colonies until late in June, observations that coincide with the late date at which one from this region was secured in Guerrero.

ILLUSTRATIONS.

Plate I. Fig. 1. (16226). View across marshes and mud flats at the mouth of Bear River, near the northern end of Great Salt Lake, Utah.

Fig. 2. (17153). Wild ducks helpless with the duck sickness (photo taken near a field laboratory at the mouth of Bear River). Many of these birds recovered in a few days and were released after numbered bands had been placed on one leg.

Plate II. Fig. 1. (B1366M). Green-winged Teal (female at left, male at right). 336 of these ducks were banded, 49 of which were reported subsequently.

Fig. 2. (B1369M). Pintail (female at left, male at right). Of 221 pintails released with bands report was received on 34.

Migration Records from Ducks and other Birds Banded in the
Salt Lake Valley, Utah.

By

Alexander Wetmore.

INTRODUCTION.

From 1914 to 1916 during ~~the~~ summer and fall the writer was occupied in field work in connection with studies by the Biological Survey, U. S. Department of Agriculture into the cause of a sickness among waterfowl prevalent in the marshes surrounding Great Salt Lake, Utah. In the course of these investigations means were found for curing individual birds of their malady and many such, were set at liberty when recovered, after an aluminum band had been placed on one leg. In addition opportunity offered to capture and mark a number of young birds of several species in a similar manner. The release of these banded birds was given publicity through the press and many returns have come from them. The information thus available on the migratory movements of these birds is presented herewith for consideration.

~~In all~~ individuals of twenty-three species of birds of various families were marked, but the majority of the 1241 bands used were placed on wild ducks belonging to nine species. All of the birds marked were of large or medium size.

The bands used were made of aluminum and were of two kinds, both manufactured originally for use in marking poultry. In each style a serial number was stamped on one side. In one the opposite face was marked "Notify U. S. Dept. Agt. Wash. D. C.," in the second the reverse was inscribed "Notify Biological Survey, Washington, D. C." Bands that were returned

from birds that had been at freedom for over a year were badly worn and after two years became thin and friable. Though in one instance a band more than four years old was recovered it is probable in most birds that chanced to survive beyond a period of three years the bands had worn until ^{they} ~~it~~ had broken and ~~were~~ lost. To be used successfully therefore, such bands should be made of material of twice the thickness used for ordinary poultry bands. ~~The wear on the metal is due not so much to actual friction in mud as to a form of electrolysis induced where birds frequent alkaline or saline waters. Wear from this source would be expected in the Great Basin region and in the West in general and might be a negligible factor in ducks that frequented fresh waters in the eastern States.~~

From the total of 1241 banded birds that have been released 180 returns have been received, or somewhat more than 14 per cent. Of the whole number of birds marked 994 were ducks of which 174 were reported. The number of returns from birds of this group, a little more than 17 per cent, indicates the results that may be obtained from work in banding birds of this family.

The returns from all of the records cover a vast area extending from western Missouri and Kansas west to California, and from Mexico to Saskatchewan. ^(see fig. 1) A study of these results indicates one line of flight to the westward from the Salt Lake Valley to California, a route followed by the green-winged teal and shovellers, and part of the mallards and pintails. Another lot of birds that includes cinnamon teal, redheads, pintails, and mallards crosses to the great plains region and travels south into Texas. Indications are that some of these fly north and east to cross the divide separating Snake River from the head waters of the Missouri to follow down east of the foothills of the Rocky Mountains. That all follow this route

is doubtful since there is nothing to prevent a direct flight across any of the mountain passes. There is also a general migration southward, probably by a comparatively small number of birds, over the Rocky Mountain Plateau, that carries the snowy herons and some of the ducks through the scattered lakes and ponds found in Utah, New Mexico and Arizona.

In examining these records it must be borne in mind that many of the birds banded at the mouth of Bear River in Utah were individuals that had not bred there. Drake pintails, and a few mallards begin to come into that region after the first week in June and continue to gather, perhaps from points far distant, from then until late fall. Migration out to other points begins about the first week in September, and there is a constant shifting of the waterfowl population during the fall as birds arrive from the north, or leave for other points. About Thanksgiving time the Bear River bays begin to freeze, and in normal years by December 1, ducks are forced out of this region. An occasional open winter may permit their sojourn until January or later. A few birds remain to winter in Utah in sloughs or channels kept open by spring water but the majority perform extended flights to other regions. Some of the wintering mallards pass a short distance northward into the Snake River drainage in Idaho.

Banded birds were set at liberty near the Duckville Gun Club at the mouth of Bear River save for a few that in 1916 were given to the State Fish and Game Commission for exhibition at the Annual State Fair in Salt Lake City, and that were subsequently set at freedom near Geneva, Utah on the shore of Utah Lake.

Migration and Occurrence Records.

In the following list are given species from which no bands have been received with a number to indicate those set at liberty: Western Grebe 4, Pied-billed Grebe 4, California Gull 1, Ring-billed Gull 1, Widgeon 14, Ruddy Duck 2, American Bittern 1, Black-crowned Night Heron 7, White-faced Glossy Ibis 104, Black-necked Stilt 4, Avocet 6, Marbled Godwit 1.

The species from which returns have been received will be considered in detail.

Mallard (Anas platyrhynchos).

In comparison to some of the other ^{species of} ducks the number of mallards handled was comparatively small, as only 72 were banded and released during the three seasons in which this work was carried on. Of these 22, a little more than thirty per cent, were killed and reported subsequently. Seven were secured near the mouth of Bear River within a few miles of the place of release, six of them, and possibly the seventh, during the same fall in which they had been marked. The other fifteen individuals divide into two main groups, one in which the birds remained until late fall or winter in the same general region as the mouth of Bear River, and another in which they ~~birds~~ made extended migrations to other regions.

In October two birds marked during the preceding month were taken on Bear River near Tremonton not far in an air line from the mouth of the stream. During November these ducks may wander more extensively as though several were taken during this month near the mouth of Bear River, and one a short distance from Tremonton, others were reported west of Salt Lake City in the sloughs near Great Salt Lake, and on Utah Lake near Provo. In addition to these one was secured late in November near Logan, Utah, and another on Snake River in Fremont County, Idaho. Records for December are more widely scattered. One bird was killed on Bear River near Collinston on December 13, and another on the Logan River in Cache Valley, on December 28. In this same month a drake was ^{shot} ~~killed~~ far to the south on the Sevier River north of Delta, Utah. During January one was taken near Pebble in Bannock County, Idaho on the fourteenth and another near Stone in the same state on the nineteenth. The latter bird was at freedom from June 17, 1915 to January 19, 1917.

From this account it would seem that a number of mallards remain in ponds and channels kept open by the inflow of spring water after more extensive bodies of water are closed by ice. Such birds pass north ~~to~~ ⁱⁿ suitable localities as far as the Snake River in Utah.

Return ~~notes~~ ^{records} from other states are notable more for their wide scattering than anything else. One banded bird secured near Bishop in Owens Valley, California (in the Great Basin) on October 16, may or may not indicate an early migration from the Salt Lake Valley. As the bird had been at freedom for two years there is no definite certainty that it had come from Utah the year it was killed though this is highly probable. A second bird was taken about March 1 in southeastern New Mexico, and a third on December 28, west of Houston, Texas. Part of the mallards from Salt Lake Valley therefore go west into California and a part into the drainage basins leading into the western part of the Gulf of Mexico.

A synopsis of all of the return records for this species is given in the following paragraphs:

UTAH. (mouth of Bear River). Banded ^{1/} September 16, 1914; recovered fall of 1914. (This bird and the one following were killed sometime after November 1 of the same year in which they were marked.) Banded September 25, 1914; recovered fall of 1914. Banded September 17, 1916; recovered November 28, 1916. Banded September 28, 1916; recovered November 12, 1916. Banded September 28, 1916; recovered November 12, 1916. Banded October 23, 1916; recovered November 15, 1916. The band of another ^{mallard} ~~bird~~ killed during the late fall of 1915 was lost so that information as to the date of banding is not available.

1

All birds were banded and released near the mouth of Bear River, Utah.

UTAH (other records) ^{1/} Banded September 16, 1914; recovered near Logan, Cache Valley, Utah on Logan River, December 28, 1914. Banded September 23, 1914; recovered two miles east of Tremonton, October 9, 1914. Banded September 25, 1914; recovered Utah Lake, three miles southwest of Provo, November 29, 1914. Banded September 5, 1915; recovered two miles south of Thatcher, November 7, 1915. Banded September 14, 1915; recovered five miles southwest of Logan, November 26, 1915. Banded August 27, 1916; recovered Sevier River, seven miles north of Delta, December 31, 1916. Banded September 7, 1916; recovered three miles southwest of Tremonton, October 9, 1916. Banded September 28, 1916; recovered on Bear River near Collinston, December 13, 1916. Banded, September 29, 1916; recovered on the west lakes near Salt Lake City, November 10, 1916.

IDAHO. Banded ^{1/} September 23, 1914; recovered Pebble, Bannock Co., Idaho, January 14, 1915. Banded September 24, 1914; recovered on Snake River, Fremont County, about November 15, 1914. Banded June 17, 1915; recovered near Stone, January 19, 1917.

CALIFORNIA. Banded ^{1/} September 24, 1914; recovered nine miles south of Bishop October 16, 1916.

NEW MEXICO. Banded ^{1/} September 25, 1914; recovered on Newman Ranch, near Newman (thirty-five miles northeast of El Paso, Texas) about March 1, 1915.

TEXAS. Banded ^{1/} September 23, 1914; recovered twenty-five miles west of Houston, Texas, December 28, 1915.

^{1/} All birds were banded and released near the mouth of Bear River, Utah.

Gadwall (Chaulelasmus streperus).

Only seventeen gadwall were banded during the course of this work but of these returns came from four individuals. As all were killed in the immediate vicinity of the mouth of Bear River during the same year in which they were set at liberty (save possibly in one instance) they offer nothing in regard to possible lines of migration for the present species. Only one of the records for this species is worthy of comment, an individual given its freedom August 27, 1916, that was killed below Willard, Utah about October 12, 1916. Others lived at liberty only a comparatively short time. A detailed statement concerning these few records follows:

UTAH ^{1/} (mouth of Bear River) ² Two banded September 11, 1915; recovered respectively October 1, and between October 1 and 8, 1915. Banded August 27, 1916; recovered about October 12, 1916. One whose band was lost before the number was recorded was killed in the fall of 1915. This bird may have been one of three marked the previous year or may have been released during 1915.

^{1/} All birds were banded and released near the mouth of Bear River, Utah.

Green-winged Teal (Nettion carolinense).

Of the total number of birds banded 386 or slightly more than one fourth were of the present species; while 49 of those marked have been reported by hunters. Among 23 of these birds killed near the mouth of Bear River near their place of release 21 were taken during the same fall in which they were set at freedom after periods varying from a few days to more than a month. Two however survived for slightly more than a year only to be taken in this same region. Seven other ~~birds~~ were reported from Utah, two from the mouth of the Weber River, and four from the marshes along the Jordan River or the sloughs west of Salt Lake City. One, set at liberty on Utah Lake was killed in the same vicinity two days later. All were taken during the same fall in which they were banded.

It would appear that the majority or at least many of the green-winged teal found in fall in the Salt Lake Valley pass in migration to California as nineteen of the return records come from that state. Several were secured in the southern Sacramento Valley and others farther south in the marshes of the San Joaquin River in Merced and Fresno counties. None were found north of Sacramento, but to the southward records come from as far down as Semitropic and Wasco in Kern County in the interior, and from Orange County, ~~§~~south of Los Angeles~~§~~, on the coast. A ^{wise}coastal record of interest is that from Watsonville, in Santa Cruz County south of San Francisco Bay. Several were secured in the famous ducking grounds in the vicinity of Los Baños. One of these individuals was secured as early as November 17, but the others were taken during the months of December and January.

Elsewhere one bird was recorded from near Miami in ~~South~~ Central Arizona in December, and one near Sanford in southern Colorado in March.

Two of the ducks under discussion enjoyed their liberty for 24 and 27 months respectively before they were killed. Others were secured during the winter following their release.

To summarize the data presented, it would appear that the majority of the green-winged teal leave Utah to winter in California, a few are found in Arizona, while ^{and} in returning north in spring a few pass through Colorado at least along the upper courses of the Rio Grande.

UTAH. (mouth of Bear River) Banded September 16, 1914; recovered about October 7, 1914. Banded September 23, 1914; recovered November 26, 1914. Banded September 23, 1914; recovered November 24, 1914. Banded September 24, 1914; recovered about October 10, 1914 (two individuals with this same record). Banded September 26, 1915; recovered October 20, 1916. Banded September 28, 1915; recovered between October 1 and 8, 1915. Banded September 2, 1916; recovered October 1, 1916. Banded September 7, 1916; recovered about November 1, 1916. Banded September 11, 1916; recovered November 17, 1916. Banded September 11, 1916; recovered October 20, 1916. Banded September 11, 1916; recovered October 25, 1916. Banded September 17, 1916; recovered about October 20, 1917. Banded September 20, 1916; recovered October 2, 1916. Banded September 20, 1916; recovered October 21, 1916. Banded September 25, 1916; recovered October 20, 1916. Banded September 29, 1916; recovered October 9, 1916. Banded September 29, 1916; recovered October 4, 1916. Banded September 30, 1916; recovered October 10, 1916. Banded October 3, 1916; recovered November 16, 1916. Banded October 15, 1916; recovered October 29, 1916. Banded October 23, 1916; recovered about November 20, 1916. Banded October 24, 1916; recovered October 31, 1916.

✓ all birds banded and released at the mouth of Bear River, Utah unless otherwise indicated.

UTAH. (other records) ^{1/}

Banded September 16, 1914; recovered at New Moon

^{1/}

All birds banded and released at the mouth of Bear River, Utah unless otherwise indicated.

Gun Club, near Salt Lake City, Utah, December 21, 1914. Banded September 26, 1915; recovered near mouth of Jordan River, Utah, December 21, 1915. Banded September 11, 1916; recovered in sloughs west of Salt Lake City, Utah, October 20, 1916. Banded September 20, 1916; recovered at the junction of Mill Creek and the Jordan River near Salt Lake City, Utah, November 17, 1916. Banded ^{2/} October 10, 1916; recovered on Utah Lake

^{2/}

Released near Geneva, Utah on Utah Lake.

near Geneva, Utah, October 12, 1916. Banded September 30, 1916; recovered on the north channel at the mouth of the Weber River, Utah, November 1, 1916. Banded October 23, 1916; recovered at the mouth of the Weber River, Utah, November 13, 1916.

CALIFORNIA. ^{1/}

Banded September 20, 1916; recovered in Yolo County, five miles from Sacramento, January 28, 1917. Banded September 23, 1914; recovered on Big Lake one mile from Clarksburg, Yolo County, January 17, 1915. Banded September 2, 1916; recovered near Rutherford, January 27, 1917. Banded September 16, 1914; recovered on the Harvey Gun Club Grounds at the junction of Cordelia and Suisun Sloughs, October 16, 1916. Banded September 16, 1914; recovered near Gustin, Merced County, January 17, 1915. Banded September 30, 1916; recovered near Ingomar, Merced County, January 28, 1917. Banded September 30, 1916; recovered near Los Baños, January 27, 1918. Banded September 29, 1916; recovered seven miles southeast of Los

Baños December 10, 1916. Banded September 11, 1916; recovered eight miles southeast of Los Baños, December 16, 1916. Banded September 14, 1915; recovered near Los Baños about January 10, 1917. Banded October 3, 1916; recovered near Brito, Merced County, December 2, 1916. Banded September 30, 1916; recovered near Brito, Merced County, January 28, 1917. Banded October 23, 1916; recovered at the mouth of the Pajaro River near Watsonville, Santa Cruz County, December 10, 1916. Banded September 7, 1916; recovered near Maricopa, Kern County, December 17, 1916. Banded September 16, 1914; recovered near Porterville, December 12, 1915. Banded September 26, 1915; recovered twelve miles northwest of Wasco (Section 13, Township 25, South Range 23, East), Kern County, January 16, 1916. Banded September 23, 1914; recovered Semitropic, January 6, 1916. Banded August 20, 1916; recovered on holdings of the Chico Land and Water Co., Orange County, thirty-three miles below Los Angeles, December 20, 1916. Banded September 16, 1914; recovered at the gun club of the Christopher Land and Water Company, Orange County (between Santa Ana and Sunset Beach) November 17, 1915.

ARIZONA.

¹ Banded September 28, 1915; recovered near Miami, December 19, 1915.

COLORADO.

¹ Banded September 30, 1916; recovered near Sanford, Conejos County. ^{March, 1917}

¹

All birds banded and released at the mouth of Bear River, Utah unless otherwise indicated.

Cinnamon Teal (Querquedula cyanoptera). ^{1/}

1/ All birds banded and released at the mouth of Bear River, Utah

Five return records were received from forty-five banded individuals of the cinnamon teal, a small number but one that includes notes of considerable interest. One released October 3, 1916 was taken in the same vicinity three days later. Another, banded September 2, 1916 was more fortunate as it was not captured until October 1, 1917, more than a year later when it was shot three miles north of the Duckville Gun Club in same marshes where it had been set at freedom. Its travels during that year may be only a source for conjecture. One banded September 1, 1916 was taken November 4, 1916 near the mouth of the Weber River and another marked September 4, 1916 was secured subsequently at the Rudy Duck Club in the marshes at the mouth of the Jordan River on October 8, 1916. The last record is one of a bird released September 16, 1914 that was recovered January 20, 1915 at Mainer Lake, Brazoria Co., Texas, a short distance west of Galveston. Though the slender evidence available indicates a migration of this species from northern Utah to the Gulf Coast of Texas it is probable that with further data some birds marked in this same region will be recovered in California. In closing it may be noted that normally the majority of individuals of this species leave the region around Great Salt Lake before the first of October so that only straggling individuals are found later, after the opening of the shooting season.

Shoveller or Spoonbill (Spatula clypeata).

The percentage of returns on banded spoonbills was slightly higher than in the case of the cinnamon teal as from a total of 48 birds released nine were subsequently reported. Six of these were killed in the Bear River marshes; several in South Bay, one on the Salt Creek marshes and one on the Chesapeake Bay) from a few days to several weeks after they had been banded. One was captured at the mouth of the Weber River and another at the mouth of the Jordan near Salt Lake City. The remaining bird was taken near Vallejo, California nearly fourteen months after it had been given its freedom. From this slight evidence it appears that some spoonbills migrate from Utah to pass the winter in California.

UTAH ^{1/} (mouth of Bear River) Banded September 29, 1914; recovered October

^{1/} All birds banded and released at the mouth of Bear River, Utah.

17, 1914. Banded September 1, 1916; recovered October 12, 1916. Banded September 25, 1916; recovered October 7, 1916. Banded September 28, 1916; recovered October 1, 1916. Banded September 28, 1916; recovered October 8, 1916. Banded September 28, 1916; recovered October 7, 1916.

UTAH ^{1/} (other records) Banded September 28, 1916; recovered near the mouth of the Weber River, October 21, 1916. Banded September 29, 1916; recovered near the mouth of the Jordan River, about October 20, 1916.

CALIFORNIA. ^{1/} Banded September 1, 1916; recovered near Vallejo, October 28, 1917.

Pintail (Dafila acuta).

While only thirty-four bands have been returned from a total of two hundred and twenty-one pintails released the distribution shown is the most remarkable of that of any of the birds included in the present account. Only ^{banded pintails} ~~seven of these birds~~ were killed near the mouth of Bear River, five during October of the same fall in which they were released, one probably secured in November, and one in April of the following spring. Other records for Utah come from Bear River a few miles above its mouth, the mouth of the Weber River, the Jordan River and the marshes west of Salt Lake City, four during October and four during November of the fall of their release.

Many pintails seem to migrate to winter to the interior valleys of California as shown by eight returns from the area between the marshes above Suisun Bay and the Imperial Valley south of Calipatria. As might be expected several of these birds were shot in the extensive marshes of the San Joaquin River in Merced and Fresno Counties. One bird released August 20 was killed near Dos Palos, Merced County on October 16 indicating an early migration, while two others were secured in November. Two were noted in December and three in January, months when in normal years pintails should all be absent from Utah.

Proper interpretation and presentation of data from states farther east is more difficult. Evidence indicates a line of flight to the northward to the drainage of the Missouri River, As one of the marked birds was secured near Glasgow, Montana on September 15, eleven days after its release. Another fall record from farther south is that of a bird from near Hyannis in the sandhill region of Nebraska. A report from near Markham on the Gulf Coast of Texas would seem to represent a bird in its winter home. In the region from the Mississippi River westward to the Great Plains numbers of

pintails linger through the winter south of the line of ice and with the coming of open water in the earliest of spring thaws crowd eagerly northward during favorable weather perhaps to be driven southward again in a few days by a sudden spell of freezing weather that closes the streams and ponds. Their number is increased in late January by birds coming from winter homes farther south. Reports from Oklahoma and eastern New Mexico at the end of January and from the panhandle of Texas near the end of February are supposed to represent such restless early migrants. ¶ One of these a bird captured on the salt plains of the Salt Fork of the Arkansas River in Oklahoma had a history of unusual interest.

In September, 1914 while crossing the flats of South Bay in a mud-boat, a flat-bottomed launch with an automobile engine as motive power to drive steel-bladed paddle wheels on either side, designed to run over smooth clay mud barely covered with water, I noted a pintail helpless with the duck sickness in the mud at oneside. A motion to the steersman of our craft was sufficient to change our course slightly and as we dashed past in a spray of mud and water, a veritable charging juggernaut, I leaned out and seized the duck and drew it in. A peculiar crescent of white feathers marked this individual duck from others so that it was easily recognized. After a week or two in captivity the bird now fairly tame was banded and released on September 23. Until I left Duckville a month later it lingered about the duck pens returning night and morning to be fed, though the shooting season was open. About February 1, 1915 this bird was captured alive in Oklahoma and on March 6 of the same year was still ^{alive and} in captivity.

The most eastern report of any of these banded ducks was that of a pintail shot on January 26, near Asbury in western Missouri, presumably another migrant in northward flight. Two records for southern Saskatchewan, one in

April and the other of uncertain date mark the northern limit from which birds have been reported.

From these notes we learn that after leaving Utah part of the pintails go to California to winter in the interior valleys, while others cross to the Great Plains and go southward to the Gulf Coast in Texas. The spring migration carries these latter individuals northward through the plains again, eastward as far as western Missouri ^{and} north at least into southern Canada. Spring records in the Missouri Valley drainage in the United States ceased after 1915 as in the following year spring shooting was prohibited by Federal Law and no further return came from ducks killed at this season. ¹ It may be noted that only a small part of the pintails found in early fall in the Salt Lake Valley nest there as the species is only moderately common as a breeder in that region. Migrants from other regions, probably to the northward arrive early, even in June, and continue to gather in suitable areas until fall. ¹

¹ See Wetmore, Wild ducks and duck foods of the Bear River Marshes, Utah, U. S. Dept. Agric., Bull. 936, May 31, 1921, pp. 7-8.

Records for the present species give some idea as to the average length of life of a pintail after it reaches maturity. Of birds banded in September, 1914, one was taken in April and one in November 1916, one in January, 1917, and one in December, 1917. Of those marked from August to October, 1916, one was shot in December, 1917, two in January and one in November, 1918, while one was fortunate enough to escape until the last of November 1920, a period of slightly more than four years.

A resume of returns for this species follows:

UTAH ^{1/} (mouth of Bear River) Banded September 16, 1914; recovered October

^{1/} All birds banded and released at the mouth of Bear River, Utah, unless otherwise indicated.

10, 1914 (two birds with identical data). Banded September 23, 1914; recovered in late fall, 1914. Banded August 27, 1916; recovered about October 12, 1916. Banded September 17, 1916; recovered October 4, 1916. Banded October 10, 1916 ^{2/}; recovered April, 1917. Banded October 15, 1916;

^{2/} Released near Geneva, Utah, on Utah Lake.

recovered on same date within one hour of time of release.

UTAH ^{1/} (other records) Banded September 28, 1914; recovered near Bear River City, Boxelder County, about October 9, 1914. Banded September 28, 1914; recovered on Third Creek between Hooper and Warren October 18, 1914. Banded September 28, 1914; recovered at mouth of Weber River, October 19, 1914. Banded September 28, 1914; recovered at the Central Gun Club, west of Salt Lake City, November 14, 1914. Banded October 10, 1916 ^{2/}; recovered on Black Marsh near Salt Lake City, about November 15, 1916. Banded October 10, 1916 ^{2/}; recovered four miles north of Brigham City, October 24, 1916. Banded October 10, 1916 ^{2/}; recovered, mouth of the Jordan River, November 15, 1916. Banded September 29, 1916; recovered, mouth of the Jordan River, end of November, 1920.

SASKATCHEWAN. ^{1/} Banded September 16, 1914; recovered near Expanse, April 13, 1916. Banded August 20, 1916; recovered Estevan, date uncertain (reported December 5, 1917).

MONTANA. ^{1/} Banded September 4, 1916; recovered on the Mahon-Hoyt reservoir six miles southeast of Glasgow, September 15, 1916.

NEBRASKA. ^{1/} Banded September 16, 1914; recovered fourteen miles north of

^{1/} All birds banded and released at the mouth of Bear River, Utah, unless otherwise indicated.

Hyannis, Nebraska, November 4, 1916.

OKLAHOMA. ^{1/} Banded September 16, 1914; recovered near Elmer, Jackson Co., Oklahoma, date uncertain (reported March 6, 1915 as killed "some time ago"). Banded September 23, 1914; recovered on the Salt Plains of Alfalfa County, about February 1, 1915.

MISSOURI. ^{1/} Banded September 28, 1914; recovered 2 miles north of Asbury, January 26, 1915.

TEXAS. ^{1/} Banded September 25, 1914; recovered near Markham, Matagorda County, January 26, 1917. Banded August 20, 1916; recovered Olton, Lamb County, February 25, 1917.

NEW MEXICO. ^{1/} Banded September 4, 1916; recovered on the Arroyo Pecos, two and one half miles south of Las Vegas, January 29, 1918.

ARIZONA. ^{1/} Banded August 27, 1916; recovered near Show Low, December, 1916.

CALIFORNIA. ^{1/} Banded August 27, 1916; recovered Eden, December 5, 1917. Banded September 17, 1916; recovered near Cordelia, Solano County, November 20, 1916. Banded October 10, 1916 ^{2/}; recovered near Alvarado, November 13, 1918. Banded

^{2/} Released near Geneva, Utah, on Utah Lake.

August 20, 1916; recovered near Dos Palos, Merced County, October 16, 1916. Banded August 20, 1916; recovered near Brito, Merced County, January 29, 1917. Banded September 16, 1914; recovered in Fresno County, January 24, 1915. Banded August 27, 1916; recovered at Buena Vista Lake near Bakersfield, January 27, 1918. Banded September 28, 1914; recovered south of Calipatria in the Imperial Valley, between December 2 and 8, 1917.

Redhead (Marila americana).

Domestic ties in the Redhead family are as loose perhaps as among any of the North American Ducks. Several females may use one nest for their eggs, and when ducklings appear they are self reliant little chaps that as often as not start off on adventurous explorations of their own with no regard for the movements of their mother. The parent may forsake her charges when they are less than half grown and it is the rule for them to be left to their own devices at an early age. Though like certain other children in their lack of respect for parental guidance and opinion young redheads are gregarious and seek company of others of the season's hatching so that they ordinarily travel in company. These inexperienced birds as they passed the duck pens where birds convalescent from the duck sickness were confined came over in search of company and clambered out on shore in an attempt to join the ducks in the cages. Trapping them when still unable to fly was an easy matter, so that in 1915 and 1916 many were captured and two hundred and thirty-nine were banded and released. Fifty-one of these have been reported by hunters. More than half, twenty-eight to be exact were taken in the Bear River Marshes all during the fall of their release. The birds were marked in August and September. Two of the returns came during the month of September, one from a bird found dead from the duck sickness, and one from an individual drowned accidentally at the duck pens. Twenty-two were killed during October, a number potted by hunters as they passed in boats up or down the river, others ^{shot} at points on the bays in the delta of the stream or near the river below Corinne. Two were secured on November 5 and two on November 12.

Among sixteen other records for Utah six came from the vicinity of Bear River above its mouth, or its larger tributaries within a radius of fifty miles. Five of these ^{returns} were secured between October 1 and 17 of the year of their release.

A single individual shot November 22 near Honeyville was reported as thin and poor so that it perhaps was diseased or injured in some way.. One was killed near the Hot Springs north of Ogden on November 18, and one near the mouth of the Weber River on October 29. From a little farther south three were reported from Syracuse near the border of Great Salt Lake, ^{on} ~~taken~~ October 14 ^{on} ~~two~~ ^{one} banded birds shot in company; and October 20. Two were shot on October 2 in the sloughs west of Salt Lake City and another in the same vicinity about the middle of November. In the Narrows of the Jordan River, twenty miles south of Salt Lake City one was killed December 24, 1915 while another was recorded from the Sevier River near Gunnison, Utah on October 1.

Three marked redheads were secured in eastern Idaho all in or near the drainage of Snake River. Two of these were shot on October 1 and 15 respectively, and one, taken in Bingham County, on December 8. The last bird mentioned was released on August 20, 1916.

Scattered records from east of the Rocky Mountains have considerable value as they indicate a line of flight to a winter range. One bird released September 27, 1916 was killed about November 27 near Ordway, in the drainage of the Arkansas River on the plains of eastern Colorado. Another banded October 23, 1916 was secured near O'Donnell in Dawson County, western Texas on November 22. A third set at freedom August 20, 1916 was secured near Nashville, Kingman County, south Central Kansas, on April 21, 1917, probably while in northward migration. The last of these distant records, one without apparent connection with the others, is that of an individual released between August 27 and September 27, 1916 and killed January 25, 1919 on the Florence Reservoir near Florence, Arizona in the Gila River Basin.

The majority of redheads on the Bear River Marshes leave in fall migration between the first and the tenth of September, and after that date only stragglers

are found. Indications from returns of banded birds are that the line of flight is to the eastward probably to a wintering ground on the Gulf Coast of Texas, though no returns have actually come from that region. It is possible that part of these birds travel northward to the drainage area of the Missouri and then swing southward over the plains since two records come from eastern Idaho at the proper season to support such belief. Release of young birds in late September after the bulk of the species has left may induce more or less aimless wandering among some, and account for part of the scattered returns. However there is a distinctly indicated movement southward along the eastern shore of Great Salt Lake for a distance of sixty miles that may be an indication of a second line of southward flight. December records for Utah and Idaho are perhaps from injured individuals unable to perform extended flights.

A synopsis of return records for the redhead follows:

UTAH ¹ (mouth of Bear River) *JP* Banded August 15, 1915; recovered October 2, 1915.

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All birds banded and released at the mouth of Bear River, Utah.

Banded September 3, 1915; recovered between October 1 and 8, 1915. Banded September 14, 1915; recovered between October 1 and 8, 1915. Banded September 20, 1915; recovered October 17, 1915. Banded September 25, 1915; recovered October 3, 1915. Banded September 25, 1915; recovered between October 1 and 8, 1915 (three birds with identical data). Banded September 25, 1915; recovered October 1, 1915. Banded September 28, 1915; recovered between October 1 and 8, 1915 (two birds with identical data). Banded September 28, 1915; recovered in October, 1915. Banded August 25, 1916; recovered October 7, 1916. Banded September 2, 1916; recovered about October 20, 1916. Banded September 4, 1916; recovered October 10, 1916. Banded September 4, 1916; recovered in October, 1916. Banded September 7, 1916; recovered October 2, 1916. Banded

September 7, 1916; recovered October 8, 1916. Banded September 8, 1916; recovered November 12, 1916. Banded September 8, 1916; recovered September 28, 1916. Banded September 8, 1916; recovered October 22, 1916. Banded September 8, 1916; recovered September 29, 1916. Banded September 27, 1916; recovered October 5, 1916. Banded September 27, 1916; recovered October 2, 1916. Banded September 27, 1916; recovered November 12, 1916. Banded September 27, 1916; recovered October 21, 1916. Banded October 15, 1916; recovered November 5, 1916. Banded October 21, 1916; recovered November 5, 1916.

UTAH ¹/₂ (other records) Banded August 22, 1915; recovered four miles west of

¹/₂

All birds banded and released at the mouth of Bear River, Utah.

Logan, October 1, 1915. Banded September 7, 1916; recovered near Honeyville, November 22, 1916. Banded September 7, 1916; recovered on Salt Creek, near Tremonton, October 11, 1916. Banded September 17, 1916; recovered three miles east of Tremonton, about October 7, 1916. Banded September 4, 1916; recovered near Bear River City, October 8, 1916. Banded September 4, 1916; recovered near Bear River City, October 17, 1916. Banded September 17, 1916; recovered near Hot Springs, Boxelder County, November 18, 1916. Banded September 4, 1916; recovered near the mouth of the Weber River, October 29, 1916. Banded September 4, 1916; recovered near Syracuse, Davis County, October 20, 1916. Banded September 7, 1916; recovered near Syracuse, Davis County, October 14, 1916 (two birds with identical data, released at same time and killed when still in company with one another). Banded August 28, 1916; recovered in the sloughs west of Salt Lake City, October 2, 1916. Banded September 4, 1916; recovered in the sloughs west of Salt Lake City, October 2, 1916 (this bird and the preceding one secured at same time and place).

Banded August 27, 1916; recovered in the vicinity of Magna (near Salt Lake City) about November 14, 1916. Banded August 22, 1915; recovered in the Narrows of the Jordan River, twenty miles south of Salt Lake City, December 24, 1915. Banded August 15, 1915; recovered three miles west of Gunnison, October 1, 1915.

IDAHO. ^{1/} Banded August 27, 1916; recovered at Mud Lake, near Hamer, about October 1, 1916, banded August 20, 1916; recovered at Tannerⁿⁿ Field Lake, Bingham County, December 8, 1918. Banded September 4, 1916; recovered at Blackfoot Swamp, twelve miles north of Soda Springs, about October 15, 1916.

COLORADO. ^{1/} Banded September 27, 1916; recovered on Ordway Lakes, near Ordway, about November 27, 1916.

KANSAS. ^{1/} Banded August 20, 1916; recovered near Nashville, Kingman County, April 21, 1917.

TEXAS. ^{1/} Banded October 23, 1916; recovered near O'Donnell, Dawson County, November 22, 1916.

ARIZONA. ^{1/} Banded between August 27 and September 27, 1916; recovered on the Florence Reservoir near Florence, January 25, 1919.

^{1/} All birds banded and released at the mouth of Bear River, Utah.

Returns from other birds.

Records of three species from other families of birds may be considered briefly.

An immature double-crested cormorant that was banded on July 3, 1915 was shot near the Jordan River twelve miles northwest of Salt Lake City on October 10, of the same year.

Of eleven Treganzas blue herons (Ardea herodias treganzai) marked in 1916 while in the nest return came from one bird, an individual banded July 3, 1916 and killed November 1, 1916, four miles southwest of Billings, Montana. The indicated northward movement after the breeding season is in accordance with a similar habit recorded for ~~black-crowned night herons~~ ^{the little blue herons and the egrets} in the east.

~~Bartson,~~

Among eighteen American coots (Fulica americana) one marked on August 20, 1916 was shot on December 5 about seventy-five miles south near Lehi, Utah. As this species is not hunted extensively in the west nothing was heard from others.

The snowy heron (Egretta candidissima) nests in colonies in the lower Bear River Marshes and on July 3 and 14, 1916 eighty-three nestlings were marked with bands. On March 1917 a peon at Mexcalitlan, Territory of Tepic, Mexico, brought a bit of aluminum to a Japanese labor contractor who chanced to pass through, saying that he had found it on the leg of a heron that he had killed and eaten. The band had been preserved out of curiosity as the peon was unable to read, but chance brought a return on one of the snowy herons marked in Utah the year previous. About June 1, 1917 another was

killed on the Papagayo Lagoon, in Guerrero, Mexico (Longitude $99^{\circ} 48'$ West, Latitude $16^{\circ} 48'$ North) and was reported through the State Department by the American Consul at Acapulco. A third record is that of one found on the San Pedro River in northwestern Cochise County, Arizona on April 13, 1919 (released in Utah July 3, 1916). From this it seems that the breeding snowy herons from the Salt Lake Valley winter on the west coast of Mexico. Their route northward may follow the Colorado River or birds may scatter in an inland flight that carries them more or less directly northward. In Utah it was observed that though part of the snowy herons arrived early, others continued to join the breeding colonies until late in June, observations that coincide with the late date at which one from this region was secured in Guerrero.

X

C O P Y

413 North First, West,
Brigham City, Utah,
Oct. 26, 1916.

Dear Sirs:

Enclosed find tag I got from a duck I killed about four miles north of Brigham City, Utah, on the 24th day of October. The duck was a gray wigan and was fat and in good shape.

Respectfully yours,

Orveil Nelson.

Band no. 4006.

W.R.M.

+

C O P Y

October 23, 1916.

I am complying with the request of the Biological Survey Department by notifying you of a tag I took from a spoonbill duck, killed at the mouth of Jordan River. This tag bears the number 4110 and the public to or whom ever kills the duck wearing such tag to notify the Biological Survey.

Yours respectfully,

L. E. Burnham,

Woods Cross, Utah.

+

C O P Y

October 22, 1916.

Biological Survey,

Washington, D. C.

On Oct. 21st I killed a duck spoonbill with tag No. 4051 on her leg on the mouth of Weaver River near Hooper, Utah. She was fat and in fine shape. If you can tell me I would like to know when and where the tag was put on and what condition she was in at that time.

W. R. Flinders,

Hooper, Utah, R. F. D. No. 2.

+

C O P Y

Layton, Utah,

Oct. 20, 1916.

U. S. Dept. Agriculture,

Washington, D. C.

Dear Sirs:

You will find enclosed one of the bands. It was taken from the leg of a duck on this date Oct. 20, 1916, at Syracuse, ^{Davis}~~Dewas~~, Co., Utah by Arnold F. Miller. The duck was in good condition.

Yours respectfully,

S. L. Miller.

Band No. 1039.

W. L. M.

+

C O P Y

Bear River City, Utah.

Box Elder Co.,

Oct. 18, 1916.

U. S. Dept. Agr.

Dear Sirs:

I have just shot a redhead duck having a steel label on its leg
and by your request am sending it to your.

Alfred Lewis.

No. 1031.

O. K. W. E. M.

x

C O P Y

Salt Lake, Utah.

Oct. 16, 1916.

Biological Survey,

Washington, D. C.

Dear Sirs:

I have a tag taken from a blue winged teal, killed Oct. 8th on the Rudy Duck Club. The Duck was fat and healthy when killed. Would like to keep tag if possible.

Yours respectfully,

Earl Pinkley,
668 Duncan Ave.,

Tag. no 3832.

o.k. w. L. M.

C O P Y

123 South 5th East,
Brigham, Utah.
Oct. 16, 1916.

Biological Survey,

Washington, D. C.

Kindly permit me to notify you that I was this day given a
duck with a label on its foot bearing the number 3766.

Very respectfully,

Geo. E. Angerbauer,

*I have written for
more exact data*

+

C O P Y

Soda Springs, Idaho.

October 16, 1916.

U. S. Dept. Agr.,

Washington, D. C.

While shooting in the Blackfoot swamp I got the limit in ducks,
one of them was labeled with this tag^X(a red head duck)

It seemed to me to be in good health. The lake is 12 miles north
of Soda Springs, Idaho.

Wallace Woodall.

Label No. 1046.

w. L. M.

X

+

C O P.Y.

Tremonton, Utah,

October 14, 1916.

Bureau of Biological Survey.

U. S. Dept. of Agriculture,

Washington, D. C.

Gentlemen:

I beg to enclose you herewith tag number 1095 taken from wild duck killed near here. Mr. Geo. Abbott. killed this duck about one week ago on pond three miles east of this town and asked us to send it in for him. He stated that the duck was a redhead, good and fat, and apparently in the best of health. It was among a large bunch of ducks that had stopped on this pond along the Bear River. It was large and fat ad could be. He stated that he ate the duck and that it was all right and could see no difference from the balance of the ducks that he killed.

Yours very truly,

Chas. McClure.

+

C O P Y.

American Fork, Utah.

October 13, 1916.

Biological Survey,

Washington, D. C.

Gentlemen:

In reading a paper which came to my hands a few days ago I read that the Department was placing leg bands on the wild ducks. And you request a statement with each band that is sent back.

I killed one with a band on. The duck was killed on October 12, 1916. I was stationed at a pond of water near Utah Lake and a few teal came over me and I managed to get one. It was in very good health. It was as large and fat as any of the other ones I got.

I am sending the band with this letter which you will find enclosed.

Very truly yours,

Donald Barratt.

Band No. 4035.

4035

+

C O P Y

Fremont^{on}, Utah, R. F. D. No. 2,

October 12, 1916.

Biological Survey,

Washington, D. C.

Dear Gentlemen:

I have this day shot a female spoonbill duck with Band No. 3783 which I am enclosing herewith according to your request. The bird was shot on my Gun Club on Salt Creek, Box Elder Co., Utah. Please inform me regarding the history of this duck and kindly return^xthe band if you particularly don't wish to keep it, yourself.

Very respectfully yours,

Fred W. Petersen.

+

C O P Y.

Garland, Utah,

October 10, 1916.

Biological Survey,

Washington, D. C.

Gentlemen:

I am enclosing you a tag #3849 that I took from a big Green-head duck's leg after shooting him on the evening of October 9, 1916. This duck was a big fine fellow being fat and nice and in good health. I shot this duck about three miles south and three west of Fremonton, Box Elder Co., Utah.

Kindly let me know when and where this duck was labeled, and oblige,

Yours truly,

J. H. Spaw.

10-5216

X

C O P Y

Glasgow, Montana,
September 16, 1916.

Biological Survey,

Washington, D. C.

Gentlemen:

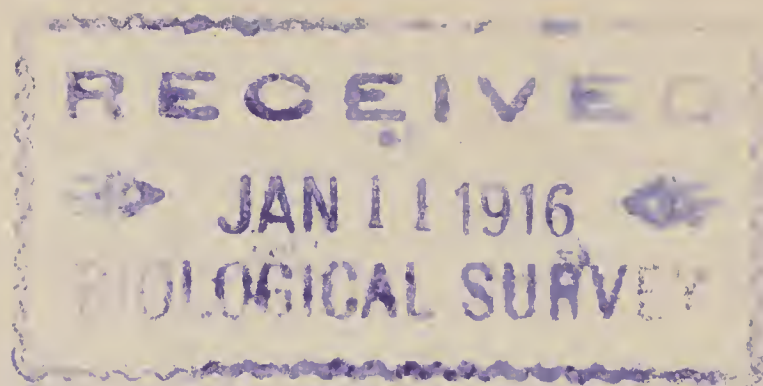
Yesterday afternoon, Sept. 15th, I shot several ducks and when I got back to town I noticed the enclosed tag No. 3814 attached to the leg of one of them. The duck was flying with a flock of mallards and was the only canvasback in the flock.

The duck was killed in the Mahon-Hoyt reservoir about six miles southwest of Glasgow. This flock of about thirty-five ducks has been inhabiting the reservoir for about two weeks. The water covers about 150 acres and is a breeding place.

I would be very glad to hear the circumstances under which this duck was liberated, as I am very interested in all kinds of game.

Very truly yours,

Geo. W. Sweitzer.



#615
Nathan Carothers

wasco cal Jan 6 - 1916

My dear friend Alex

I am sending you a band
that was taken off a duck
leg at Semi Tropic about 10 miles
west of here. I never got a
chance to get you the alkali you
wanted. I went down to the lake
but before I could get around to the
south side, there came up a rain
and spoiled all the alkali. I am
putting up a Garage here at wasco,
I may go to work for my self.
now I don't want you to think I took
that band off a leg with a Red sweater on.
I was up to Hermore the other day
did not see any Red sweaters (all
Green ones). If you ever come down in
this part of the world. Can in.
will close for this time yours as ever
Nathan Carothers
PS got your card. (Thanks) Same to you

Migration Records from Ducks and other Birds Banded in the
Salt Lake Valley, Utah.

By
Alexander Wetmore.

INTRODUCTION.

From 1914 to 1916 during the summer and fall the writer was occupied in field work in connection with studies by the Biological Survey, U. S. Department of Agriculture into the cause of a sickness among waterfowl prevalent in the marshes surrounding Great Salt Lake, Utah. In the course of these investigations means were found for curing individual birds of their malady and many such, were set at liberty when recovered, after an aluminum band had been placed on one leg. In addition opportunity offered to capture and mark a number of young birds of several species in a similar manner. The release of these banded birds was given publicity through the press and many returns have come from them. The information thus available on the migratory movements of these birds is presented herewith for consideration.

~~In all~~ individuals of twenty-three species of birds of various families were marked, but the majority of the 1241 bands used were placed on wild ducks belonging to nine species. All of the birds marked were of large or medium size.)

The bands used were made of aluminum and were of two kinds, both manufactured originally for use in marking poultry. In each style a serial number was stamped on one side. In one the opposite face was marked "Notify U. S. Dept. Agt. Wash. D. C.," in the second the reverse was inscribed "Notify Biological Survey, Washington, D. C." Bands that were returned

from birds that had been at freedom for over a year were badly worn and after two years became thin and friable. Though in one instance a band more than four years old was recovered it is probable in most birds that chanced to survive beyond a period of three years the bands had worn until ^{they} ~~it~~ had broken and ^{were} ~~was~~ lost. To be used successfully therefore, such bands should be made of material of twice the thickness used for ordinary poultry bands. The wear on the metal is due not so much to actual friction in mud as to a form of electrolysis induced where birds frequent alkaline or saline waters. Wear from this source would be expected in the Great Basin region and in the West in general, and might be a negligible factor in ducks that frequented fresh waters in the eastern States.

From the total of 1241 banded birds that have been released 180 returns have been received, or somewhat more than 14 per cent. Of the whole number of birds marked 994 were ducks of which 174 were reported. The number of returns from birds of this group, a little more than 17 per cent, indicates the results that may be obtained from work in banding birds of this family.

The returns from all of the records cover a vast area extending from western Missouri and Kansas west to California, and from Mexico to Saskatchewan. ^(see fig. 1) A study of these results indicates one line of flight to the westward from the Salt Lake Valley to California, a route followed by the green-winged teal and shovellers, and part of the mallards and pintails. Another lot of birds that includes cinnamon teal, redheads, pintails, and mallards crosses to the great plains region and travels south into Texas. Indications are that some of these fly north and east to cross the divide separating Snake River from the head waters of the Missouri to follow down east of the foothills of the Rocky Mountains. That all follow this route

is doubtful since there is nothing to prevent a direct flight across any of the mountain passes. There is also a general migration southward, probably by a comparatively small number of birds, over the Rocky Mountain Plateau, that carries the snowy herons and some of the ducks through the scattered lakes and ponds found in Utah, New Mexico and Arizona.

In examining these records it must be borne in mind that many of the birds banded at the mouth of Bear River in Utah were individuals that had not bred there. Drake pintails, and a few mallards begin to come into that region after the first week in June and continue to gather, perhaps from points far distant, from then until late fall. Migration out to other points begins about the first week in September, and there is a constant shifting of the waterfowl population during the fall as birds arrive from the north, or leave for other points. About Thanksgiving time the Bear River bays begin to freeze, and in normal years by December 1, ducks are forced out of this region. An occasional open winter may permit their sojourn until January or later. A few birds remain to winter in Utah in sloughs or channels kept open by spring water but the majority perform extended flights to other regions. Some of the wintering mallards pass a short distance northward into the Snake River drainage in Idaho.

Banded birds were set at liberty near the Duckville Gun Club at the mouth of Bear River save for a few that in 1916 were given to the State Fish and Game Commission for exhibition at the Annual State Fair in Salt Lake City, and that were subsequently set at freedom near Geneva, Utah on the shore of Utah Lake.

Migration and Occurrence Records.

In the following list are given species from which no bands have been received with a number to indicate those set at liberty: Western Grebe 4, Pied-billed Grebe 4, California Gull 1, Ring-billed Gull 1, Widgeon 14, Ruddy Duck 2, American Bittern 1, Black-crowned Night Heron 7, White-faced Glossy Ibis 104, Black-necked Stilt 4, Avocet 6, Marbled Godwit 1.

The species from which returns have been received will be considered in detail.

Mallard (Anas platyrhynchos).

In comparison to some of the other ^{species of} ducks the number of mallards handled was comparatively small, as only 72 were banded and released during the three seasons in which this work was carried on. Of these 22, a little more than thirty per cent, were killed and reported subsequently. Seven were secured near the mouth of Bear River within a few miles of this place of release, six of them, and possibly the seventh, during the same fall in which they had been marked. The other fifteen individuals divide into two main groups, one in which the birds remained until late fall or winter in the same general region as the mouth of Bear River, and another in which the ~~birds~~ made extended migrations to other regions.

In October two birds marked during the preceding month were taken on Bear River near Tremonton not far in an air line from the mouth of the stream. During November these ducks may wander more extensively as though several were taken during this month near the mouth of Bear River, and one a short distance from Tremonton, others were reported west of Salt Lake City in the sloughs near Great Salt Lake, and on Utah Lake near Provo. In addition to these one was secured late in November near Logan, Utah, and another on Snake River in Fremont County, Idaho. Records for December are more widely scattered. One bird was killed on Bear River near Collinston on December 13, and another on the Logan River in Cache Valley, on December 28. In this same month a drake was ~~killed~~ ^{shot} far to the south on the Sevier River north of Delta, Utah. During January one was taken near Pebble in Bannock County, Idaho on the fourteenth and another near Stone in the same state on the nineteenth. The latter bird was at freedom from June 17, 1915 to January 19, 1917.

From this account it would seem that a number of mallards remain in ponds and channels kept open by the inflow of spring water after more extensive bodies of water are closed by ice. Such birds pass north ~~to~~ ⁱⁿ suitable localities as far as the Snake River in Utah.

Return notes ^{records} from other states are notable more for their wide scattering than anything else. One banded bird secured near Bishop in Owens Valley, California (in the Great Basin) on October 16, may or may not indicate an early migration from the Salt Lake Valley. As the bird had been at freedom for two years there is no definite certainty that it had come from Utah the year it was killed though this is highly probable. A second bird was taken about March 1 in southeastern New Mexico, and a third on December 28, west of Houston, Texas. Part of the mallards from Salt Lake Valley therefore go west into California and a part into the drainage basins leading into the western part of the Gulf of Mexico.

A synopsis of all of the return records for this species is given in the following paragraphs:

UTAH. (mouth of Bear River). Banded ¹ September 16, 1914; recovered fall of 1914. (This bird and the one following were killed sometime after November 1 of the same year in which they were marked.) Banded September 25, 1914; recovered fall of 1914. Banded September 17, 1916; recovered November 28, 1916. Banded September 28, 1916; recovered November 12, 1916. Banded September 28, 1916; recovered November 12, 1916. Banded October 23, 1916; recovered November 15, 1916. The band of another ^{mallard} ~~bird~~ killed during the late fall of 1915 was lost so that information as to the date of banding is not available.

1

All birds were banded and released near the mouth of Bear River, Utah.

UTAH, (other records)

Banded ^{1/} September 16, 1914; recovered near Logan, Cache Valley, ~~Utah~~ on Logan River, December 28, 1914. Banded September 23, 1914; recovered two miles east of Tremonton, October 9, 1914. Banded September 25, 1914; recovered Utah Lake, three miles southwest of Provo, November 29, 1914. Banded September 5, 1915; recovered two miles south of Thatcher, November 7, 1915. Banded September 14, 1915; recovered five miles southwest of Logan, November 26, 1915. Banded August 27, 1916; recovered Sevier River, seven miles north of Delta, December 31, 1916. Banded September 7, 1916; recovered three miles southwest of Tremonton, October 9, 1916. Banded September 28, 1916; recovered on Bear River near Collinston, December 13, 1916. Banded, September 29, 1916; recovered on the west lakes near Salt Lake City, November 10, 1916.

IDAHO.

Banded ^{1/} September 23, 1914; recovered Pebble, Bannock Co., Idaho, January 14, 1915. Banded September 24, 1914; recovered on Snake River, Fremont County, about November 15, 1914. Banded June 17, 1915; recovered near Stone, January 19, 1917.

CALIFORNIA.

Banded ^{1/} September 24, 1914; recovered nine miles south of Bishop October 16, 1916.

NEW MEXICO.

Banded ^{1/} September 25, 1914; recovered on Newman Ranch, near Newman (thirty-five miles northeast of El Paso, Texas) about March 1, 1915.

TEXAS.

Banded ^{1/} September 23, 1914; recovered twenty-five miles west of Houston, Texas, December 28, 1915.

^{1/}

All birds were banded and released near the mouth of Bear River, Utah.

Gadwall (Chareleasmus streperus).

Only seventeen gadwall were banded during the course of this work but of these returns came from four individuals. As all were killed in the immediate vicinity of the mouth of Bear River during the same year in which they were set at liberty (save possibly in one instance) they offer nothing in regard to possible lines of migration for the present species. Only one of the records for this species is worthy of comment, an individual given its freedom August 27, 1916, that was killed below Willard, Utah about October 12, 1916. Others lived at liberty only a comparatively short time. A detailed statement concerning these few records follows:

UTAH ^{1/} (mouth of Bear River) ² Two banded September 11, 1915; recovered respectively October 1, and between October 1 and 8, 1915. Banded August 27, 1916; recovered about October 12, 1916. One whose band was lost before the number was recorded was killed in the fall of 1915. This bird may have been one of three marked the previous year or may have been released during 1915.

^{1/} All birds were banded and released near the mouth of Bear River, Utah.

Green-winged Teal (Nettion carolinense).

Of the total number of birds banded 336 or slightly more than one fourth were of the present species; while 49 of those marked have been reported by hunters. Among 23 of these birds killed near the mouth of Bear River near their place of release 21 were taken during the same fall in which they were set at freedom after periods varying from a few days to more than a month. Two however survived for slightly more than a year only to be taken in this same region. Seven other birds were reported from Utah, two from the mouth of the Weber River, and four from the marshes along the Jordan River or the sloughs west of Salt Lake City. One, set at liberty on Utah Lake was killed in the same vicinity two days later. All were taken during the same fall in which they were banded.

It would appear that the majority or at least many of the green-winged teal found in fall in the Salt Lake Valley pass in migration to California as nineteen of the return records come from that state. Several were secured in the southern Sacramento Valley and others farther south in the marshes of the San Joaquin River in Merced and Fresno counties. None were found north of Sacramento but to the southward records come from as far down as Semitropic and Wasco in Kern County in the interior and from Orange County (south of Los Angeles) on the coast. A ^{wise} coastal record of interest is that from Watsonville in Santa Cruz County south of San Francisco Bay. Several were secured in the famous ducking grounds in the vicinity of Los Baños. One of these individuals was secured as early as November 17, but the others were taken during the months of December and January.

Elsewhere one bird was recorded from near Miami in South Central Arizona in December, and one near Sanford in southern Colorado in March.

Two of the ducks under discussion enjoyed their liberty for 24 and 27 months respectively before they were killed. Others were secured during the winter following their release.

To summarize the data presented, it would appear that the majority of the green-winged teal leave Utah to winter in California, a few are found in Arizona, while ^{and} in returning north in spring a few pass through Colorado at least along the upper courses of the Rio Grande.

UTAH (mouth of Bear River). Banded September 16, 1914; recovered about October 7, 1914. Banded September 23, 1914; recovered November 26, 1914. Banded September 23, 1914; recovered November 24, 1914. Banded September 24, 1914; recovered about October 10, 1914 (two individuals with this same record). Banded September 26, 1915; recovered October 20, 1916. Banded September 28, 1915; recovered between October 1 and 8, 1915. Banded September 2, 1916; recovered October 1, 1916. Banded September 7, 1916; recovered about November 1, 1916. Banded September 11, 1916; recovered November 17, 1916. Banded September 11, 1916; recovered October 20, 1916. Banded September 11, 1916; recovered October 25, 1916. Banded September 17, 1916; recovered about October 20, 1917. Banded September 20, 1916; recovered October 2, 1916. Banded September 20, 1916; recovered October 21, 1916. Banded September 25, 1916; recovered October 20, 1916. Banded September 29, 1916; recovered October 9, 1916. Banded September 29, 1916; recovered October 4, 1916. Banded September 30, 1916; recovered October 10, 1916. Banded October 3, 1916; recovered November 16, 1916. Banded October 15, 1916; recovered October 29, 1916. Banded October 23, 1916; recovered about November 20, 1916. Banded October 24, 1916; recovered October 31, 1916.

UTAH (other records). ^{1/} Banded September 16, 1914; recovered at New Moon

^{1/} All birds banded and released at the mouth of Bear River, Utah unless otherwise indicated.

Gun Club, near Salt Lake City, Utah, December 21, 1914. Banded September 26, 1915; recovered near mouth of Jordan River, Utah, December 21, 1915. Banded September 11, 1916; recovered in sloughs west of Salt Lake City, Utah, October 20, 1916. Banded September 20, 1916; recovered at the junction of Mill Creek and the Jordan River near Salt Lake City, Utah, November 17, 1916. Banded ^{2/} October 10, 1916; recovered on Utah Lake

^{2/} Released near Geneva, Utah on Utah Lake.

near Geneva, Utah, October 12, 1916. Banded September 30, 1916; recovered on the north channel at the mouth of the Weber River, Utah, November 1, 1916. Banded October 23, 1916; recovered at the mouth of the Weber River, Utah, November 13, 1916.

CALIFORNIA. ^{1/} Banded September 20, 1916; recovered in Yolo County, five miles from Sacramento, January 28, 1917. Banded September 23, 1914; recovered on Big Lake one mile from Clarksburg, Yolo County, January 17, 1915. Banded September 2, 1916; recovered near Rutherford, January 27, 1917. Banded September 16, 1914; recovered on the Harvey Gun Club Grounds at the junction of Cordelia and Suisun Sloughs, October 16, 1916. Banded September 16, 1914; recovered near Gustin, Merced County, January 17, 1915. Banded September 30, 1916; recovered near Ingomar, Merced County, January 28, 1917. Banded September 30, 1916; recovered near Los Baños, January 27, 1918. Banded September 29, 1916; recovered seven miles southeast of Los

Banos December 10, 1916. Banded September 11, 1916; recovered eight miles southeast of Los Banos, December 16, 1916. Banded September 14, 1916; recovered near Los Banos about January 10, 1917. Banded October 3, 1916; recovered near Brito, Merced County, December 2, 1916. Banded September 30, 1916; recovered near Brito, Merced County, January 28, 1917. Banded October 23, 1916; recovered at the mouth of the Pajaro River near Watsonville, Santa Cruz County, December 10, 1916. Banded September 7, 1916; recovered near Maricopa, Kern County, December 17, 1916. Banded September 16, 1914; recovered near Porterville, December 12, 1915. Banded September 26, 1915; recovered twelve miles northwest of Wasco (Section 13, Township 25, South Range 23, East), Kern County, January 16, 1916. September 23, 1914; recovered Semitropic, January 6, 1916. Banded August 20, 1916; recovered on holdings of the Chico Land and Water Co., Orange County, thirty-three miles below Los Angeles, December 20, 1916. Banded September 16, 1914; recovered at the gun club of the Christopher Land and Water Company, Orange County (between Santa Ana and Sunset Beach) November 17, 1915.

ARIZONA.

^{1/} Banded September 23, 1915; recovered near Miami, December 19, 1915.

COLORADO.

^{1/} Banded September 30, 1916; recovered near Sanford, Conejos County.

March, 1917

^{1/}

All birds banded and released at the mouth of Bear River, Utah unless otherwise indicated.

1/

Cinnamon Teal (Querquedula cyanoptera).

1/

Five return records were received from forty-five banded individuals of the cinnamon teal, a small number but one that includes notes of considerable interest. One released October 3, 1916 was taken in the same vicinity three days later. Another, banded September 2, 1916 was more fortunate as it was not captured until October 1, 1917, more than a year later when it was shot three miles north of the Duckville Gun Club in same marshes where it had been set at freedom. Its travels during that year may be only a source for conjecture. One banded September 1, 1916 was taken November 4, 1916 near the mouth of the Weber River and another marked September 4, 1916 was secured subsequently at the Rudy Duck Club in the marshes at the mouth of the Jordan River on October 8, 1916. The last record is one of a bird released September 16, 1914 that was recovered January 20, 1915 at Mainer Lake, Brazoria Co., Texas, a short distance west of Galveston. Though the slender evidence available indicates a migration of this species from northern Utah to the Gulf Coast of Texas it is probable that with further data some birds marked in this same region will be recovered in California. In closing it may be noted that normally the majority of individuals of this species leave the region around Great Salt Lake before the first of October so that only straggling individuals are found later, after the opening of the shooting season.

Shoveller or Spoonbill (Spatula clypeata).

The percentage of returns on banded spoonbills was slightly higher than in the case of the cinnamon teal as from a total of 48 birds released nine were subsequently reported. Six of these were killed in the Bear River marshes, several in South Bay, one on the Salt Creek marshes and one on the Chesapeake Bay from a few days to several weeks after they had been banded. One was captured at the mouth of the Weber River and another at the mouth of the Jordan near Salt Lake City. The remaining bird was taken near Vallejo, California nearly fourteen months after it had been given its freedom. From this slight evidence it appears that some spoonbills migrate from Utah to pass the winter in California.

UTAH ¹ (mouth of Bear River). Banded September 29, 1914; recovered October

¹ All birds banded and released at the mouth of Bear River, Utah.

17, 1914. Banded September 1, 1916; recovered October 12, 1916. Banded September 25, 1916; recovered October 7, 1916. Banded September 28, 1916; recovered October 1, 1916. Banded September 28, 1916; recovered October 8, 1916. Banded September 28, 1916; recovered October 7, 1916.

UTAH ¹ (other records). Banded September 28, 1916; recovered near the mouth of the Weber River, October 21, 1916. Banded September 29, 1916; recovered near the mouth of the Jordan River, about October 20, 1916.

CALIFORNIA. ¹ Banded September 1, 1916; recovered near Vallejo, October 28, 1917.

Pintail (*Pafla acuta*).

While only thirty-four bands have been returned from a total of two hundred and twenty-one pintails released the distribution shown is the most remarkable of that of any of the birds included in the present account. Only ^{banded pintails} ~~seven of these birds~~ were killed near the mouth of Bear River, five during October of the same fall in which they were released, one probably secured in November, and one in April of the following spring. Other records for Utah come from Bear River a few miles above its mouth, the mouth of the Weber River, the Jordan River and the marshes west of Salt Lake City, four during October and four during November of the fall of their release.

Many pintails seem to migrate to winter to the interior valleys of California as shown by eight returns from the area between the marshes above Suisun Bay and the Imperial Valley south of California. As might be expected several of these birds were shot in the extensive marshes of the San Joaquin River in Merced and Fresno Counties. One bird released August 20 was killed near Dos Palos, Merced County on October 16 indicating an early migration, while two others were secured in November. Two were noted in December and three in January, months when in normal years pintails should all be absent from Utah.

Proper interpretation and presentation of data from states farther east is more difficult. Evidence indicates a line of flight to the northward to the drainage of the Missouri River, ~~As~~ one of the marked birds was secured near Glasgow, Montana on September 15, eleven days after its release. Another fall record from farther south is that of a bird from near Hyannis in the sandhill region of Nebraska. A report from near Markham on the Gulf Coast of Texas would seem to represent a bird in its winter home. In the region from the Mississippi River westward to the Great Plains numbers of

pintails linger through the winter south of the line of ice and with the coming of open water in the earliest of spring thaws crowd eagerly northward during favorable weather perhaps to be driven southward again in a few days by a sudden spell of freezing weather that closes the streams and ponds. Their number is increased in late January by birds coming from winter homes farther south. Reports from Oklahoma and eastern New Mexico at the end of January and from the panhandle of Texas near the end of February are supposed to represent such restless early migrants. One of these a bird captured on the salt plains of the Salt Fork of the Arkansas River in Oklahoma had a history of unusual interest.

In September, 1914 while crossing the flats of South Bay in a mud-boat, a flat-bottomed launch with an automobile engine as motive power to drive steel-bladed paddle wheels on either side, designed to run over smooth clay mud barely covered with water, I noted a pintail helpless with the duck sickness in the mud at oneside. A motion to the steersman of our craft was sufficient to change our course slightly and as we dashed past in a spray of mud and water, a veritable charging juggernaut, I leaned out and seized the duck and drew it in. A peculiar crescent of white feathers marked this individual duck from others so that it was easily recognized. After a week or two in captivity the bird now fairly tame was banded and released on September 23. Until I left Duckville a month later it lingered about the duck pens returning night and morning to be fed, though the shooting season was open. About February 1, 1915 this bird was captured alive in Oklahoma and on March 6 of the same year was still in captivity.

The most eastern report of any of these banded ducks was that of a pintail shot on January 26, near Asbury in western Missouri, presumably another migrant in northward flight. Two records for southern Saskatchewan, one in

April and the other of uncertain date mark the northern limit from which birds have been reported.

From these notes we learn that after leaving Utah part of the pintails go to California to winter in the interior valleys, while others cross to the Great Plains and go southward to the Gulf Coast in Texas. The spring migration carries these latter individuals northward through the plains again, eastward as far as western Missouri north at least into southern Canada. Spring records in the Missouri Valley drainage in the United States ceased after 1915 as in the following year spring shooting was prohibited by Federal Law and no further return came from ducks killed at this season. It may be noted that only a small part of the pintails found in early fall in the Salt Lake Valley nest there as the species is only moderately common as a breeder in that region. Migrants from other regions, probably to the northward arrive early, even in June, and continue to gather in suitable areas until fall. ¹

¹ See Wetmore, Wild ducks and duck foods of the Bear River Marshes, Utah, U. S. Dept. Agric., Bull. 936, May 31, 1921, pp. 7-8.

Records for the present species give some idea as to the average length of life of a pintail after it reaches maturity. Of birds banded in September, 1914, one was taken in April and one in November 1916, one in January, 1917, and one in December, 1917. Of those marked from August to October, 1916, one was shot in December, 1917, two in January and one in November, 1918, while one was fortunate enough to escape until the last of November 1920, a period of slightly more than four years.

A resume of returns for this species follows:

UTAH ^{1/} (mouth of Bear River). Banded September 16, 1914; recovered October

^{1/} All birds banded and released at the mouth of Bear River, Utah, unless otherwise indicated.

10, 1914 (two birds with identical data). Banded September 23, 1914; recovered in late fall, 1914. Banded August 27, 1916; recovered about October 12, 1916. Banded September 17, 1916; recovered October 4, 1916. Banded October 10, 1916 ^{2/}; recovered April, 1917. Banded October 15, 1916;

^{2/} Released near Geneva, Utah, on Utah Lake.

recovered on same date within one hour of time of release.

UTAH ^{1/} (other records). Banded September 28, 1914; recovered near Bear River City, Boxelder County, about October 9, 1914. Banded September 28, 1914; recovered on Third Creek between Hooper and Warren October 18, 1914. Banded September 28, 1914; recovered at mouth of Weber River, October 19, 1914. Banded September 28, 1914; recovered at the Central Gun Club, west of Salt Lake City, November 14, 1914. Banded October 10, 1916 ^{2/}; recovered on Black Marsh near Salt Lake City, about November 15, 1916. Banded October 10, 1916 ^{2/}; recovered four miles north of Brigham City, October 24, 1916. Banded October 10, 1916 ^{2/}; recovered, mouth of the Jordan River, November 15, 1916. Banded September 29, 1916; recovered, mouth of the Jordan River, end of November, 1920.

SASKATCHEWAN. ^{1/} Banded September 16, 1914; recovered near Expanse, April 12, 1918. Banded August 20, 1916; recovered Estevan, date uncertain (reported December 5, 1917).

MONTANA. ^{1/} Banded September 4, 1916; recovered on the Mahon-Hoyt reservoir six miles southeast of Glasgow, September 15, 1916.

NEBRASKA. ¹ Banded September 16, 1914; recovered fourteen miles north of

¹ All birds banded and released at the mouth of Bear River, Utah, unless otherwise indicated.

Hyannis, Nebraska, November 4, 1916.

OKLAHOMA. ¹ Banded September 16, 1914; recovered near Elmer, Jackson Co., Oklahoma, date uncertain (reported March 6, 1915 as killed "some time ago"). Banded September 23, 1914; recovered on the Salt Plains of Alfalfa County, about February 1, 1915.

MISSOURI. ¹ Banded September 28, 1914; recovered 2 miles north of Asbury, January 26, 1915.

TEXAS. ¹ Banded September 25, 1914; recovered near Markham, Matagorda County, January 26, 1917. Banded August 20, 1916; recovered Olton, Lamb County, February 25, 1917.

NEW MEXICO. ¹ Banded September 4, 1916; recovered on the Arroyo Pecos, two and one half miles south of Las Vegas, January 29, 1918.

ARIZONA. ¹ Banded August 27, 1916; recovered near Show Low, December, 1916.

CALIFORNIA. ¹ Banded August 27, 1916; recovered Eden, December 5, 1917. Banded September 17, 1916; recovered near Cordelia, Solano County, November 20, 1916. Banded October 10, 1916 ²; recovered near Alvarado, November 13, 1918. Banded

² Released near Geneva, Utah, on Utah Lake.

August 20, 1916; recovered near Dos Palos, Merced County, October 16, 1916.

Banded August 20, 1916; recovered near Brito, Merced County, January 29, 1917.

Banded September 16, 1914; recovered in Fresno County, January 24, 1915. Banded

August 27, 1916; recovered at Buena Vista Lake near Bakersfield, January 27,

1918. Banded September 28, 1914; recovered south of Calipatria in the Imperial Valley, between December 2 and 8, 1917.

Redhead (Marila americana).

Domestic ties in the Redhead family are as loose perhaps as among any of the North American Ducks. Several females may use one nest for their eggs, and when ducklings appear they are self reliant little chaps that as often as not start off on adventurous explorations of their own with no regard for the movements of their mother. The parent may forsake her charges when they are less than half grown and it is the rule for them to be left to their own devices at an early age. Though like certain other children in their lack of respect for parental guidance and opinion young redheads are gregarious and seek company of others of the season's hatching so that they ordinarily travel in company. These inexperienced birds as they passed the duck pens where birds convalescent from the duck sickness were confined came over in search of company and clambered out on shore in an attempt to join the ducks in the cages. Trapping them when still unable to fly was an easy matter, so that in 1915 and 1916 many were captured and two hundred and thirty-nine were banded and released. Fifty-one of these have been reported by hunters. More than half, twenty-eight to be exact were taken in the Bear River Marshes all during the fall of their release. The birds were marked in August and September. Two of the returns came during the month of September, one from a bird found dead from the duck sickness, and one from an individual drowned accidentally at the duck pens. Twenty-two were killed during October, a number potted by hunters as they passed in boats up or down the river, others at points on the bays in the delta of the stream or near the river below Corinne. Two were secured on November 5 and two on November 12.

Among sixteen other records for Utah six came from the vicinity of Bear River above its mouth, or its larger tributaries within a radius of fifty miles. Five of these were secured between October 1 and 17 of the year of their release.

A single individual shot November 22 near Honeyville was reported as thin and poor so that it perhaps was diseased or injured in some way.. One was killed near the Hot Springs north of Ogden on November 18, and one near the mouth of the Weber River on October 29. From a little farther south three were reported from Syracuse near the border of Great Salt Lake, taken October 14 (two banded birds shot in company) and October 20. Two were shot on October 2 in the sloughs west of Salt Lake City and another in the same vicinity about the middle of November. In the Narrows of the Jordan River, twenty miles south of Salt Lake City one was killed December 24, 1915 while another was recorded from the Sevier River near Gunnison, Utah on October 1.

Three marked redheads were secured in eastern Idaho all in or near the drainage of Snake River. Two of these were shot on October 1 and 15 respectively, and one, taken in Bingham County, on December 8. The last bird mentioned was released on August 20, 1916.

Scattered records from east of the Rocky Mountains have considerable value as they indicate a line of flight to a winter range. One bird released September 27, 1916 was killed about November 27 near Ordway, in the drainage of the Arkansas River on the plains of eastern Colorado. Another banded October 23, 1916 was secured near O'Donnell in Dawson County, western Texas on November 22. A third set at freedom August 20, 1916 was secured near Nashville, Kingman County, south Central Kansas, on April 21, 1917, probably while in northward migration. The last of these distant records, one without apparent connection with the others, is that of an individual released between August 27 and September 27, 1916 and killed January 25, 1919 on the Florence Reservoir near Florence, Arizona in the Gila River Basin.

The majority of redheads on the Bear River Marshes leave in fall migration between the first and the tenth of September, and after that date only stragglers

are found. Indications from returns of banded birds are that the line of flight is to the eastward probably to a wintering ground on the Gulf Coast of Texas, though no returns have actually come from that region. It is possible that part of these birds travel northward to the drainage area of the Missouri and then swing southward over the plains since two records come from eastern Idaho at the proper season to support such belief. Release of young birds in late September after the bulk of the species has left may induce more or less aimless wandering among some, and account for part of the scattered returns. However there is a distinctly indicated movement southward along the eastern shore of Great Salt Lake for a distance of sixty miles that may be an indication of a second line of southward flight. December records for Utah and Idaho are perhaps from injured individuals unable to perform extended flights.

UTAH ^{1/} (mouth of Bear River). Banded August 15, 1915; recovered October 2, 1915.

^{1/} All birds banded and released at the mouth of Bear River, Utah.

Banded September 8, 1915; recovered between October 1 and 8, 1915. Banded September 14, 1915; recovered between October 1 and 8, 1915. Banded September 20, 1915; recovered October 17, 1915. Banded September 25, 1915; recovered October 3, 1915. Banded September 25, 1915; recovered between October 1 and 8, 1915 (three birds with identical data). Banded September 25, 1915; recovered October 1, 1915. Banded September 28, 1915; recovered between October 1 and 8, 1915 (two birds with identical data). Banded September 28, 1915; recovered in October, 1915. Banded August 25, 1916; recovered October 7, 1916. Banded September 2, 1916; recovered about October 20, 1916. Banded September 4, 1916; recovered October 10, 1916. Banded September 4, 1916; recovered in October, 1916. Banded September 7, 1916; recovered October 2, 1916. Banded

September 7, 1916; recovered October 8, 1916. Banded September 8, 1916; recovered November 12, 1916. Banded September 8, 1916; recovered September 28, 1916. Banded September 8, 1916; recovered October 22, 1916. Banded September 8, 1916; recovered September 29, 1916. Banded September 27, 1916; recovered October 3, 1916. Banded September 27, 1916; recovered October 2, 1916. Banded September 27, 1916; recovered November 12, 1916. Banded September 27, 1916; recovered October 21, 1916. Banded October 15, 1916; recovered November 5, 1916. Banded October 21, 1916; recovered November 5, 1916.

UTAH ¹ (other records). Banded August 22, 1915; recovered four miles west of

¹

All birds banded and released at the mouth of Bear River, Utah.

Logan, October 1, 1915. Banded September 7, 1916; recovered near Honeyville, November 22, 1916. Banded September 7, 1916; recovered on Salt Creek, near Tremonton, October 11, 1916. Banded September 17, 1916; recovered three miles east of Tremonton, about October 7, 1916. Banded September 4, 1916; recovered near Bear River City, October 8, 1916. Banded September 4, 1916; recovered near Bear River City, October 17, 1916. Banded September 17, 1916; recovered near Hot Springs, Boxelder County, November 18, 1916. Banded September 4, 1916; recovered near the mouth of the Weber River, October 29, 1916. Banded September 4, 1916; recovered near Syracuse, Davis County, October 20, 1916. Banded September 7, 1916; recovered near Syracuse, Davis County, October 14, 1916 (two birds with identical data, released at same time and killed when still in company with one another). Banded August 28, 1916; recovered in the sloughs west of Salt Lake City, October 2, 1916. Banded September 4, 1916; recovered in the sloughs west of Salt Lake City, October 2, 1916 (this bird and the preceding one secured at same time and place).

Banded August 27, 1916; recovered in the vicinity of Magna (near Salt Lake City) about November 14, 1916. Banded August 22, 1915; recovered in the Narrows of the Jordan River, twenty miles south of Salt Lake City, December 24, 1915. Banded August 15, 1915; recovered three miles west of Gunnison, October 1, 1915.

¹✓ IDAHO. Banded August 27, 1916; recovered at Mud Lake, near Hamer, about October 1, 1916; banded August 20, 1916; recovered at Tamar Field Lake, Bingham County, December 8, 1918. Banded September 4, 1916; recovered at Blackfoot Swamp, twelve miles north of Soda Springs, about October 15, 1916.

¹✓ COLORADO. Banded September 27, 1916; recovered on Ordway Lakes, near Ordway, about November 27, 1916.

¹✓ KANSAS. Banded August 20, 1916; recovered near Nashville, Kingman County, April 21, 1917.

¹✓ TEXAS. Banded October 23, 1916; recovered near O'Donnell, Dawson County, November 22, 1916.

¹✓ ARIZONA. Banded between August 27 and September 27, 1916; recovered on the Florence Reservoir near Florence January 25, 1919.

¹✓ All birds banded and released at the mouth of Bear River, Utah.

Returns from other birds.

Records of three species from other families of birds may be considered briefly.

An immature double-crested cormorant that was banded on July 8, 1915 was shot near the Jordan River twelve miles northwest of Salt Lake City on October 10, of the same year.

Of eleven Treganzas blue herons (Ardea herodias treganzai) marked in 1916 while in the nest return came from one bird, an individual banded July 8, 1916 and killed November 1, 1916, four miles southwest of Billings, Montana. The indicated northward movement after the breeding season is in accordance with a similar habit recorded for black-crowned night herons in the east. ¹

¹ Bartsch,

Among eighteen American coots (Fulica americana) one marked on August 20, 1916 was shot on December 5 about seventy-five miles south near Lehi, Utah. As this species is not hunted extensively in the west nothing was heard from others.

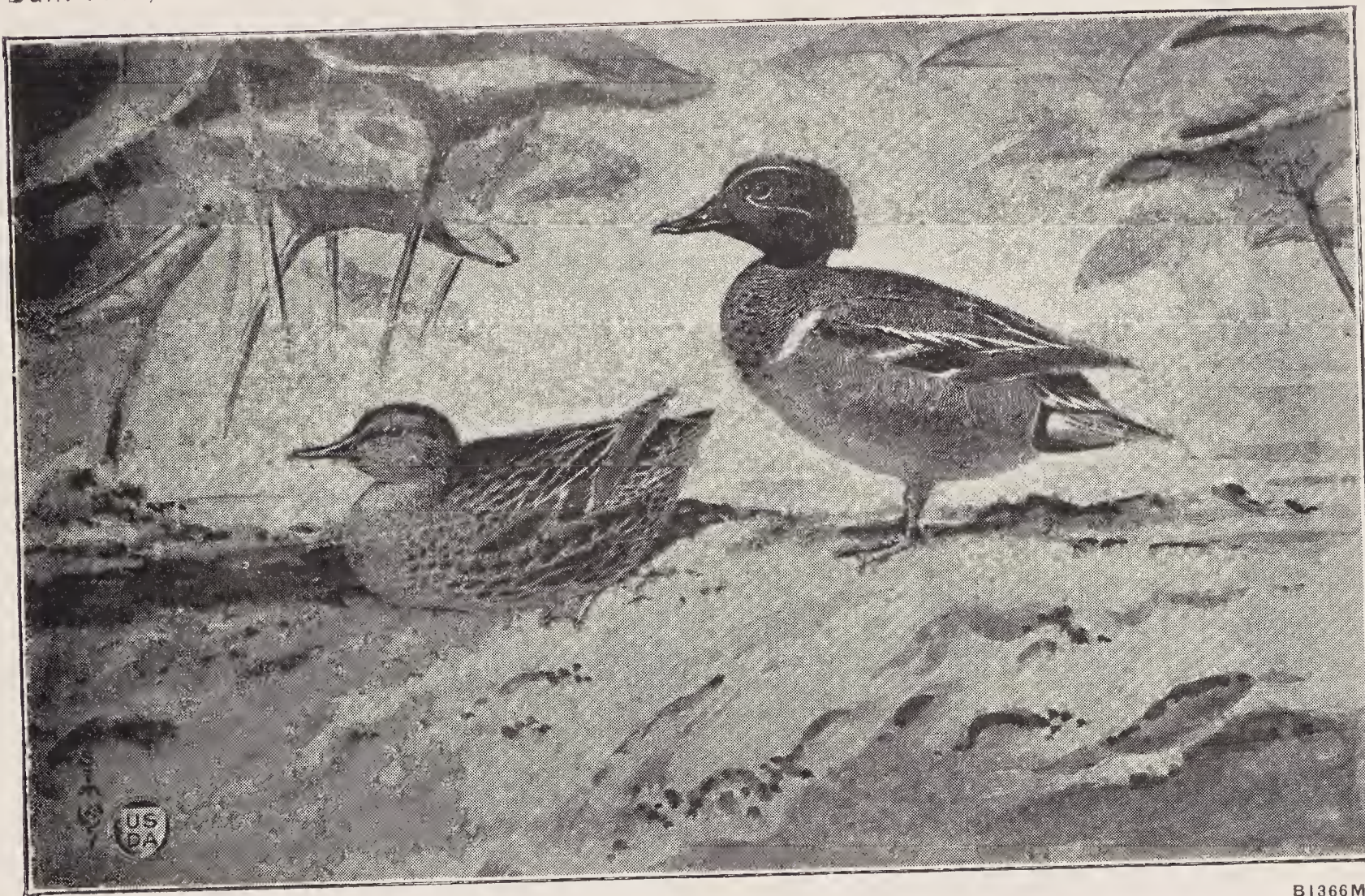
The snowy heron (Egretta candidissima) nests in colonies in the lower Bear River Marshes and on July 3 and 14, 1916 eighty-three nestlings were marked with bands. On March 1917 a peon at Mexcoaltitan, Territory of Tepic, Mexico, brought a bit of aluminum to a Japanese labor contractor who chanced to pass through, saying that he had found it on the leg of a heron that he had killed and eaten. The band had been preserved out of curiosity as the peon was unable to read, but chance brought a return on one of the snowy herons marked in Utah the year previous. About June 1, 1917 another was

killed on the Papagayo Lagoon, in Guerrero, Mexico (Longitude $99^{\circ} 48'$ West, Latitude $16^{\circ} 48'$ North) and was reported through the State Department by the American Consul at Acapulco. A third record is that of one found on the San Pedro River in northwestern Cochise County, Arizona on April 13, 1919 (released in Utah July 3, 1916). From this it seems that the breeding snowy herons from the Salt Lake Valley winter on the west coast of Mexico. Their route northward may follow the Colorado River or birds may scatter in an inland flight that carries them more or less directly northward. In Utah it was observed that though part of the snowy herons arrived early, others continued to join the breeding colonies until late in June, observations that coincide with the late date at which one from this region was secured in Guerrero.

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Bull. 1145, U. S. Dept. of Agriculture.

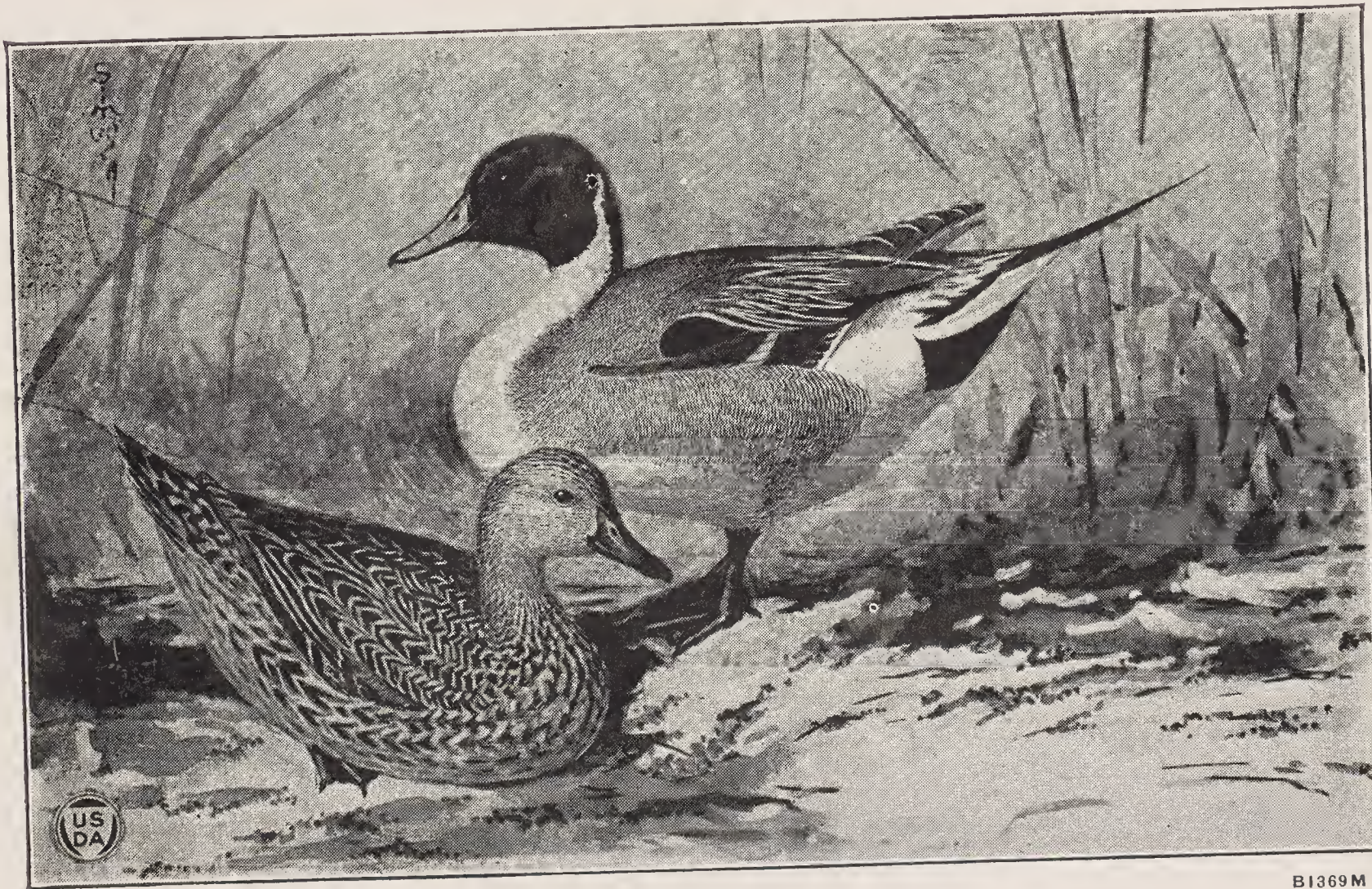
PLATE II.



B1366M

FIG. 1.—GREEN-WINGED TEALS.

Male at right; female at left. Bands were placed on 335 of these birds, and of this number 49 were subsequently recovered.



B1369M

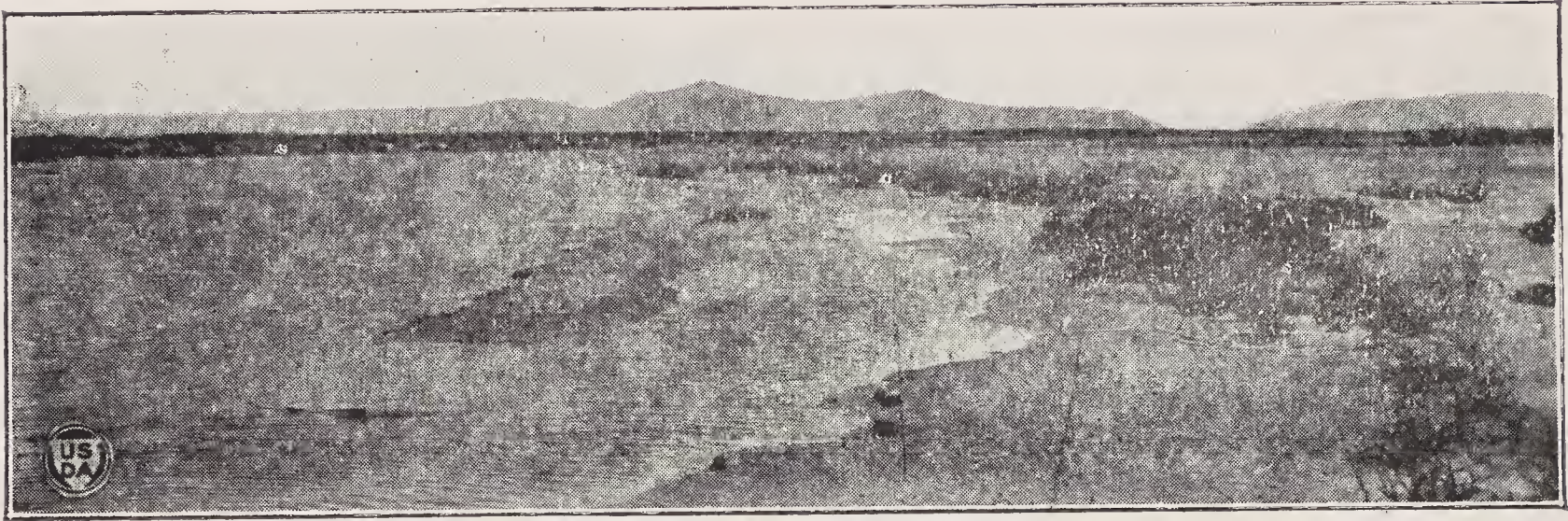
FIG. 2.—PINTAILS.

Male at right; female at left. Reports were received on 34 of the 221 banded pintails released.

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PLATE I.



B16226

FIG. 1.—MOUTH OF BEAR RIVER, UTAH.

View across marshes and mud flats near northern end of Great Salt Lake.



B17153

FIG. 2.—SICK DUCKS AT LABORATORY PEN.

Many of these recovered in a few days and were released, each bearing a numbered band on one leg. (Photograph taken near mouth of Bear River.)